

JOURNAL OF TUBERCULOSIS

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ORIGINAL ARTICLES.

THE PROGRESS OF HELIOTHERAPY IN THE TREATMENT OF TUBERCULOSIS.

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HELIOOTHERAPY has been adopted in both surgical tuberculosis and pulmonary tuberculosis in a large number of institutions in the United States and in Canada. In the New England States the climatic restrictions are serious, and shorten the period of the year during which this treatment has been deemed possible. The technique employed by different men in widely-separated localities in the United States has varied very naturally as to a strict adherence to the methods of Bernhard and Rollier in the Swiss Alps, or those of the School of Lyons, represented by Ollier and Poncet, Armand-Delille, Vignard and Jouffray, or by practitioners at Cannes and Berck-sur-Mer. Some variation is inevitable.

At the high elevations of New Mexico and Colorado the solar rays are more intense even than at stations like Leysin in Switzerland. Sunlight, besides the visible spectrum, is composed of other radiations, which in the infra-red are calorific and in the ultra-violet chemical. These latter are the ones that effect most strongly photographic plates, and seem to have the most active influence in heliotherapy. In mountain stations, where the air contains less water vapour, the rays are less

readily intercepted, and hence heliotherapy is more easily practised. But at the seashore there is almost equal efficiency, and it is held that, having penetrated the vapour layer, the light rays are intensified by reflection from the surface of the sea.

The luminosity of the sea air and the power of the solar radiation at the seaside are augmented by the refraction of light by the sea water giving special properties with luminosity. The sea water absorbs the ultra-red rays that are calorific; it reflects the yellows (luminous) and the blue and violet rays that are chemical rays, the bactericidal action of which is recognized. The time required for treatment at the Alpine stations is probably less than at lower stations. But Rollier and his Swiss colleagues have strongly urged the adoption of heliotherapy at the seashore sanatoria, and this is now quite as successfully accomplished. Common experience shows that tanning takes place readily in both mountain and marine stations. The chief difference seems to be in the number of days with sunshine. The proportion of ultra-violet rays was found by Berthelot to be approximately the same on the summit of Mont Blanc, on the shore of the Mediterranean, and on the plains of France. Too much exposure to the sun's rays without a preliminary gradation of exposure may be distinctly injurious, and produce an erythema or burn of more or less intensity. A technique, therefore, which provides for an increasing dosage, graded according to definite steps, must be insisted on, so as to avoid accidents, and secure tanning over the entire body.

The occurrence of pigmentation is in the nature of a defensive reaction, and it becomes so intense in many cases as to resemble more or less the colour of the black race. Persons vary greatly in their response to this effect of light, and some are quite refractory to this stimulus. As a protective agent pigmentation may arrest or transform the ultra-violet light rays, and there seems to be a correspondence between the degree of pigmentation and the curative action.

The patient is healed, not because he acquires pigmentation, but because of deep-seated defence reactions. Pigmentation depends on the proportion of hæmoglobin in the blood; it is an index of the general resistance of which the organism is capable and its power of reacting to heliotherapy. If the tan subsides it is an indication that the hæmoglobin supply is giving out. In tuberculosis there is a strong tendency of the autogenous tuberculin to intoxicate the organism and lower the hæmoglobin percentage. This secondary anæmia is sometimes revealed in the depigmentation of tanned children. Hence the tanning and the depigmentation are important both for diagnosis, prognosis, and treatment. There must be sufficient hæmoglobin for the child to tan normally and to keep his tanning after the course of heliotherapy.



GENERAL
NUTRITIONAL
CONDITION.



LOCAL
CONDITION
OF WRIST
AND HAND.



X-RAY
EVIDENCE.



On admission, May, 1919.

Ten months later.

HELIOOTHERAPY IN SURGICAL TUBERCULOSIS: A CASE OF TUBERCULOSIS
OF WRIST AND HAND.

The sun bath acts on the skin first of all, stimulating the peripheral circulation, and thus nourishing the muscles, vivifying the blood, and increasing the hæmoglobin percentage. This effect is so constant that sunlight is an ideal remedy for debility in children, especially when associated with proper physical training. This action on cellular metabolism seems to be the whole secret of the success of heliotherapy in certain chronic affections, thanks to its stimulation of the processes which induce immunity. This explains the advantage of preventive heliotherapy against tuberculosis, such as L. Jeanneret has long been advocating.¹ In non-affected children and adults the sun does not stimulate the processes of immunity, as there is nothing to start them with. Jeanneret says that although the general resistance may be superb, as in Australian natives and in the cattle of the Hungarian plains constantly in the sunlight, yet infection once installed is liable to run a peculiarly malignant course, owing to the total lack of tuberculosis in their environment. But in children already infected, the sunlight hastens and intensifies the protecting immunity processes already under way, and aids the organism in keeping the infection down and crushing it out. When well tanned, healthy children develop an acute infectious disease. They bleach out rapidly; the children that tanned rapidly in summer and retained their pigmentation until spring were the healthiest ones.

Rollier trains his patients, both children and adults, by systematic and strict methods always adapted to the individual case, so that they live in the free air of the Alps almost wholly naked but, apparently, in perfect comfort. The training begins with exposure to the air and, afterwards, exposure to the sunlight. Under no circumstances does Rollier allow the patient to be exposed to the sun on the same day or on the day following his arrival in the mountains. According to the gravity of the case or the general resistance of the patient, from three to ten days are allowed for acclimatization to the altitude and training for the air cure. Children seem to display a remarkable tolerance for exposure to sunshine.

After the preliminary period of acclimatization the sun cure is commenced. This is gradual, and has due regard to the reaction of the patient, which is carefully checked on individual charts. The first day the feet are exposed, at intervals of one hour, five times and for a period of only five minutes. The next day the legs are exposed as far as the groin in this same manner. The third day the thighs from knee to groin are exposed for ten minutes three or four times; the legs for ten minutes three or four times, while the feet are exposed three or four times for ten minutes. The fourth day the abdomen is exposed;

¹ See article by Jeanneret and Messerli, *Revue de la Suisse Romande*, November, 1917.

on the fifth the thorax, back and front, when the precaution is taken to cover the heart with a damp cloth.¹

The first hospital especially designed and constructed in America for heliotherapy is the J. N. Adam Memorial Hospital at Perrysburg, New York. It is a municipal institution of the city of Buffalo. Its elevation is 1,650 feet, and is forty miles from Buffalo and fourteen miles from Lake Erie. Dr. J. H. Pryor, Dr. C. L. Hyde, and Dr. LoGrasso have published full reports of the cases treated, with illustrations of the sun cure pavilions, the open-air school, and patients undergoing cure. The technique is very definitely given, and follows Rollier's method faithfully. The climate of this region is cloudy and cold in winter, with a mean temperature of 47° F. and 1,729 hours of sunshine, a low record compared with stations in Colorado, New Mexico, and California. Treatment was begun in December, 1913, and over five hundred patients have been treated up to the present time. Two-thirds of these have apparently recovered. About half of the total number admitted are children with glandular tuberculosis, and next in order are tuberculous peritonitis and disease of the spine, hip, and knee. The average length of stay for all surgical cases is 8.4 months, and for those discharged as apparently recovered or arrested it was 13.5 months. Of the patients who remained three months or longer 67 per cent. were discharged apparently recovered or arrested; of those who remained six months or longer, 77 per cent. were discharged apparently recovered or arrested, and of those who remained nine months or longer 82 per cent. were discharged as apparently recovered. This shows the important bearing that the length of stay has upon the results of surgical tuberculosis. The opinion is that all cases of tuberculous peritonitis, unless complicated by advanced pulmonary tuberculosis or fæcal fistula, will recover under heliotherapy. In winter, on account of the sun not being always sufficiently strong, and on account of the large number of unfavourable days when sharp winds and snow flurries are frequent, the treatment is interrupted at times. During the winter it is insisted that no matter how strong the sun may be, as soon as a child looks or feels chilly he must be taken into a warm room and the treatment temporarily discontinued. The effect on the patient is quite remarkable. Many present a pitiful picture on admission. They are anæmic, emaciated, and fever-ridden, and with features suggestive of suffering; yet in a few weeks these patients go through a complete transformation. Weight increases and the blood conditions improve, hæmoglobin and red cells increasing, and leucocytosis, if present, is

¹ The technique is fully described in Rollier's book, "La Cure de Soleil," and in "La Cure Solaire des Tuberculoses Chirurgicales," by Vignard and Jouffray, and "L'Héliothérapie," by Dr. Armand-Delille (Monographies Cliniques, Masson et Cie, Paris, Nos. 74 and 75). Rollier has in preparation a detailed work in English, which will shortly appear.

reduced, and an actual increase in the lymphocytes takes place as pigmentation progresses.

About 1912 and 1913 heliotherapy was introduced at the Sea Breeze Hospital, then situated at Coney Island, New York. It was not followed strictly on Rollier's lines, but included partial exposure of diseased areas to sunlight in connection with a general outdoor cure. However, the results have been very gratifying. This hospital is now situated at Rockaway Point, Long Island.

At Saranac Lake, New York, elevation 1,650 feet, Dr. Edgar Mayer has studied the subject from another angle, and has treated many cases of tuberculous laryngitis, using a water-cooled concentrated mercury quartz light of rather strong intensity close to the larynx. The results in pulmonary tuberculosis by this method have not proved so favourable.

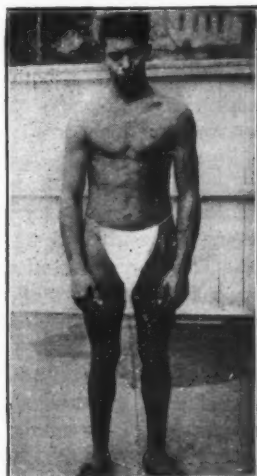
At the Albuquerque Sanatorium in New Mexico, a sun bath was constructed and used for heliotherapy ten years ago, and has been used extensively for both pulmonary and surgical tuberculosis. Peritoneal and intestinal tuberculosis and genito-urinary tuberculosis have been successfully treated by this method. This sanatorium is situated at an elevation of 5,000 feet, one mile from Albuquerque, in the fertile valley of the Rio Grande. Mountain peaks ninety miles to the west are seen as distinctly through the rarefied air as if they were only a few miles distant.

The diathermancy of the air in New Mexico, Colorado, and Arizona and the very large proportion of clear days insure an uninterrupted cure. The rainfall at Albuquerque averages only 7 inches a year, and over half of this occurs during July and August. The same climatic advantages obtain at Silver City, elevation 5,800 feet; at Fort Stanton, elevation 6,231 feet, the seat of the U.S. Public Health Hospital for Tuberculosis; and at Fort Bayard, elevation 4,450 feet, the seat of the U.S. Army Sanatorium for Tuberculosis. These are all in southern New Mexico. The U.S. Naval Sanatorium is in Colorado, 375 miles north-east of Albuquerque, at Las Animas, elevation 3,900 feet.

The U.S. Public Health Service employs both natural heliotherapy and the artificial forms to a large extent. In many instances the surgeons prefer the artificial forms, on account of the greater ease of application, the more exact dosage, and its unfailing applicability; but at stations in the arid south-west and in the institutions near Asheville, North Carolina, natural heliotherapy is quite extensively employed, especially for surgical cases. At P.H. Hospital 50 at Prescott, Arizona, Surgeon Robert C. Buck has had very satisfactory experience with the solar-therapeutic-laryngoscope during the past year. He states that heliotherapy used in this manner is far in advance of any other method so far used in his clinic in the treatment of tuberculosis



On admission, April, 1918.



On discharge, August, 1919.

A CASE OF TUBERCULOUS PERITONITIS.



On admission, March, 1919.



One year later.

A CASE OF TUBERCULOSIS OF THE SPINE.

of the larynx. In an unpublished report which the Surgeon-General was kind enough to send me, he details the technique and the results in four cases of laryngeal tuberculosis. In one case with active tuberculosis in all lobes of both lungs the patient had not spoken above a whisper for eighteen months. After four months of daily treatment, the large mass of infiltration of the right ventricular fold melted away, and the voice suddenly and completely returned, and has been retained during the last three months. In laryngeal tuberculosis the patients are trained to use the laryngeal mirror, starting with one minute a day and increasing in the space of six weeks to an eight-minute exposure. There is an outdoor solarium for general heliotherapy.

Similar treatment is afforded at P.H.S. Hospital 41 at New Haven, Connecticut, where Surgeons Bacon and Barlow are using heliotherapy for surgical cases; and at P.H.S. Hospital 45, at Biltmore, North Carolina, there are fifty patients with surgical tuberculosis under treatment, and great satisfaction is expressed by the medical officers and patients at the results obtained. Similar results are obtained at P.H.S. Hospital 60, at Oteen, North Carolina.

Dr. A. G. Shortle, of Albuquerque, in a report made in 1916, noted an increase in the lymphocyte count, averaging in thirty cases about 12 per cent. These observations were made during exposure, and by the following morning the count returned to normal. It seems probable that the patients' hyperæmia and lymphocytosis resulted in a condition somewhat similar to that produced locally by Bier's hyperæmia treatment. A decrease of the blood-pressure was also found at this time, probably due to the dilation of the superficial bloodvessels. It was found necessary to modify the rules laid down by Rollier, inasmuch as the sunlight in New Mexico is so much more intense than in Switzerland. At the Albuquerque Sanatorium they begin with fifteen minutes' exposure front of the feet and the same for the back of the feet, exposing only the feet at first; then each day exposing two or three inches more of the legs, and finally the body, taking from two weeks to a month to reach complete exposure of the body. At no time is the head exposed; it must be shaded under an umbrella or other shade. The time of exposure is then extended to thirty minutes front and thirty minutes back, but seldom more than that. In this manner it requires but a few weeks for marked pigmentation. A sensation of dizziness or nausea is a warning to discontinue the bath for that day.

In pulmonary tuberculosis care must be taken in these high altitudes, as it is very easy to bring severe reaction by overexposure. Ice bags to the heart and to the head are used when there is considerable pulmonary involvement, and particularly if there is fever.

In California Dr. F. M. Pottenger has used heliotherapy for seventeen years at his sanatorium in Monrovia, in the southern portion

of the State near Los Angeles. Light energy has never been used by him to the exclusion of other forms of treatment, but as an aid in connection with other well-tried tonic measures which build up the patient and make him more resistant to infection. In his view the application of heliotherapy to pulmonary tuberculosis will be disappointing if one expects to see certain immediate results; it is an aid, not a cure.

In southern California it is well to use sun baths for those suffering from active tuberculosis in the early morning, beginning at eight or nine o'clock, according to the season, taking advantage of the fact that the rays at this time of day possess much less energy than they do later in the day. The morning is preferred to the afternoon, because temperatures are naturally higher in the afternoon than in the morning. For those who are stronger and suffering from incipient, inactive, or arrested disease the baths may be taken nearer the middle of the day. Dr. Pottenger makes use of mirrors more than direct sunlight in his cases. When these are used it is necessary to cut off the heat rays, and this is done by covering the mirror with blue glass, which permits the reflection of the powerful chemical rays. The mirrors are 3 feet (0.9 metre) in diameter. They concentrate the light on a focus about 6 or 8 inches in diameter, at a distance of $3\frac{1}{2}$ feet from the reflectors. In this way there is a concentration of rays so as to afford a bath richer in blue, indigo, and violet over what could be had in the general direct sun bath. If the patient sits in the sun a large portion of the body is exposed to the direct rays of the sun during the bath, and this proves to be a combined local bath of reflected concentrated chemical energy and a direct sun bath at the same time.¹

Through the courtesy of Dr. Horace LoGrasso, Superintendent of the J. N. Adam Memorial Hospital, Perrysburg, N.Y., and the staff of this hospital, I have been permitted to reproduce illustrations of some of the cases which have been treated in that institution.

¹ See article by Dr. F. M. Pottenger, *Interstate Medical Journal*, St. Louis, Mo., 1915, No. 8.

TEAM WORK IN THE TREATMENT OF SURGICAL TUBERCULOSIS.¹

By GATHORNE R. GIRDLESTONE,

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My own work in this field lies principally in the treatment of tuberculosis of bones and joints, but much that is to be said is true of the other varieties of surgical tuberculosis.

For a good many years now we have been learning more and more of the life-history of the tubercle bacillus in the human body, and we no longer look on the infection of a joint with tuberculosis as a disease in itself. We have learnt to link up that manifestation with a pre-existing infection of the body, which may have been of long standing, and developed most insidiously. It is only too easy to think of the treatment of disease when fully developed and presenting a typical picture. But we are reverting in thought to the aim of the treatment in the beginnings of disease.

To come to immediate grips with the question, let us trace the story of tuberculous infection associated with joint disease, and we shall quickly realize that the surgeon who has to take charge of the case when the disease is in being is only one of a team of fellow-workers. Now the success of such a team depends on the knowledge, skill, and action of every member, as well as on the thorough inter-working of each unit with the others. If I may adopt a metaphor from football, we can look upon the orthopaedic surgeon as the full back. When an attack is initiated by the opposing side, the forwards, who would represent the primary health workers of all sorts, often suffice to prevent any actual progress. If, however, ground is gained, other defences will be called upon; but one must recognize that great progress has, as a rule, been made by the disease before a joint is infected and the surgeon is called upon to make his "tackle."

Our ideal aim, of course, should be to prevent the infection of the child, and in discussing this question it is best to consider a young child as the typical victim.

In the Report of the Royal Commission on Tuberculosis (1911), a standard method of differentiating the human and the bovine tubercle bacillus was laid down, and a very great deal of work has been done

¹ Abstract of a lecture delivered before the Reading Tuberculosis Dispensary Care Association, January 27, 1922.

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on these lines since that date (especially by F. Eastwood and A. S. Griffiths working at Cambridge). The results of these enquiries have been of the most intense interest. Our immediate concern, however, lies in the fact that bovine bacilli are responsible for a large percentage (varying between 25 and 75 per cent.) of the infections of young children, so that certain members of the team will be concerned with the prevention of milk infection, others with the protection of children from infection with human bacilli. We cannot take too wide a conception of the treatment of surgical tuberculosis, and everyone will agree that the best treatment is to prevent the bacilli entering the body at all.

Other members of "the pack" will be doing equally important duty. We must realize that at present all children are exposed to infection by living tubercle bacilli; it may not be so in the future, but it certainly is so still. On the other hand, we know that if a child is given enough food and enough air and exercise, he will almost always rise superior to any attack these bacilli may make upon his system. We should endeavour so to raise the standards of life amongst the infants and young children of the poor that they are able to resist systemic infection with tuberculosis, and we must teach the parents the value of various forms of food, the virtue of fresh air, and aim at the provision of the proper conditions of housing and general hygiene. Now that is another ideal, but once again the attack will pierce this line of defence, and a certain number of children will begin to show signs of ailing. Let us assume that the bacilli have pierced the alimentary mucous membrane, and are lodged in the lymphatic glands of the mesentery and perhaps of the mediastinum. The defences of the body have been pierced, the infection has scored a definite success, and made its mark on the health of the patient through the debilitating effect of the toxin and interference with the lymphatic flow from the intestines, and thus with the absorption of the valuable fatty substances in the chyle. The body, however, is on its defence, the natural processes of reaction and healing are aroused, and the members of our team must throw their weight into the struggle on the side of the patient. Often in these cases there is no direct evidence of glandular infection, and the condition seems what has been often termed a "pre-tuberculous condition." Yet this is the time above all others when treatment should be applied. The damage done has been slight, no vital organ, no bone or joint has been infected; if the reaction of the body can be helped the attack will be routed, and the bacilli incarcerated. And if his standard of health can be maintained, the individual will be so much the better able to resist any further dosage of infection to which he may be exposed.

It is to the organization of such work as infant welfare centres and health visiting, and to the skill and quick observation of the workers in

these units, that we look for the recognition of these early tuberculous infections; and the successful treatment of these cases will depend both on the wise teaching of these health workers, and on the facilities that they are given to provide extra food, better conditions, and, where necessary, means for the special treatment of the children in open-air hospitals.

But once again another line of defence may be pierced, and an active tuberculous focus become established in the lymphatic system. From this focus showers of tubercle bacilli will be dispersed throughout the body from time to time through the blood-stream. Often these showers pass with no more serious or permanent damage than a little fever and malaise, but eventually the time comes when a focus of infection is set up in a bone or in a joint, whether from a specially large dose of bacilli deposited on one spot, or from local devitalization of the tissues following a blow, or from a general lowering of vitality. Perhaps now for the first time the case is brought to the notice of a doctor, and he is told that the child has been rather off colour of late, has limped a little, complained of some aching pain, moaned a little in his sleep, and sometimes awaked with a sudden cry. Possibly at this stage the doctor is unable to find much, and often he will not be inclined to send the child a long distance to a hospital with such a very indefinite history and so very little to show. Here the value of co-operation between the professional members of the team lies in mutual readiness to undertake consultations at all times and in the organization of means by which such a consultation is made very simple and easy in any part of the district which is served.¹

We have left the patient with the development of a bone or joint focus, bacilli have been deposited and have grown and multiplied, causing inflammation and local damage. Every day is now of supreme value. If the disease is unchecked destruction goes on, the joint tissues are progressively attacked and damaged, illness increases, perhaps septic infection is added to the picture, and the whole sad story of a typical advanced tuberculous joint develops. But here, if ever, "a stitch in time saves nine," and if, when the first sign of the disease is noticed, prompt and effective treatment is applied, the disease can almost always be checked, the damage can almost always be kept within very small limits, deformity can be prevented, joint movement

¹ Here Mr. Girdlestone showed on the screen a rough map of the three counties of Berkshire, Buckinghamshire, and Oxfordshire, indicating the system of clinics which has been organized. The special hospital-school for the treatment of cripple children, the Wingfield Orthopaedic Hospital, is situated at Headington. This hospital has the great advantage of working in close affiliation with the Radcliffe Infirmary and in co-operation with the Royal Berkshire and Royal Buckinghamshire Hospitals. In many places in the three counties small red crosses appear. In each of these there exists a clinic—that is, a room in which out-patients are seen by members of the hospital staff at regular intervals, and to which a doctor can always send a case for consultation or treatment.

can often ultimately be restored, and the child saved from pain, illness, misery, crippledom, and death. If this is to be achieved the local doctor, the tuberculosis officer, and the surgical officer in charge of the general and special hospitals must work together. With the least possible delay the patient must be put under the ideal conditions of perfect immobilization and protection of the infected joint, a good climate, a sunny open-air ward, and given ample and attractive food. I think we are all of us more and more recognizing that we are members of a team, and that the game is one of saving our fellows from the attacks of disease and its attendant miseries. During the development of my work in this district it has been extraordinarily delightful to realize how ready and willing almost everybody has been to play the game in the interests of the patient. Once a joint is attacked, the skill of the game lies in early diagnosis, and prompt admission for effective treatment is the object of the play.

Just now the economy campaign is making it difficult for tuberculosis officers to authorize the admission of children to a special hospital. To delay treatment, or try to avoid the expense of providing it, is false economy; but even were it not so, it is surely politically unsound to economize in the health of the poor. After much patient labour, the personnel and organization for the diagnosis and treatment of these conditions have been got together, and the official health services linked up with voluntary organizations, such as your Association and the hospital which I represent. Surely it would be madness for the nation as a whole to force the Ministry of Health and Board of Education to allow this trained and willing team to become dispersed, and the means of adequate treatment to disappear! So far as Reading and the counties of Berkshire, Buckinghamshire, and Oxfordshire are concerned, there is a whole-hearted desire on the part of the health and tuberculosis officers to maintain this essential work, and we on our part will, I trust, be at least equally determined to back up their efforts, and if necessary, for the time being, to take on a larger share of the cost of the work. We propose to admit without delay children attacked by spinal caries, hip disease, and so on, believing that the authorities will make every possible effort to authorize such admissions. These so-called economies are so easy when carried out on paper, but so very different for those who, like ourselves, are concerned with case work. Let me tell you one or two stories.

A year and a half ago I was asked to see a case by the Berkshire tuberculosis officer: a girl of fourteen, with spinal caries with a discharging sore, a hip affected, a knee which had suffered extreme inflammatory and destructive changes, and was flexed beyond a right angle, enormously swollen, discharging from many sinuses, and extensively ulcerated. The child was desperately ill, suffered constant pain,

every jar to the knee was torture, and every time the dressings were changed she had to go through an ordeal which she could hardly face. There were other minor tuberculous manifestations. This child had been ill four and a half years. She had been admitted from time to time to a hospital for the opening of an abscess or some such treatment, but it had proved impossible to give her early and continuous effective treatment. We took her in at once. The true surgical rest which could alone give her peace and relieve her pain was a tremendous problem. However, I am thankful to say it was realized, owing largely to the splendid work of the nursing staff. She picked up gradually, and after some months it became possible to amputate her left knee. I may say that this is the only case of a tuberculous joint in a child which I have ever had to amputate. She is now healed and well, she has been home on a month's leave, has now been discharged from hospital, and is to start training as a dressmaker, for while in hospital she became most expert with her needle! I am thankful to say we have made the best of a bad job! But those four and a half years of suffering, misery, and illness *could have been avoided!*

Let me tell you of another case, a boy of eight or so, in whom a tuberculous knee had been diagnosed at a hospital six months before I saw him. All this time he had been on a waiting list for admission, but could not be admitted owing to the pressure of other cases, and during those six months his knee had gone from bad to worse; he was ill, in constant suffering, and practically sleepless from pain. The knee had become badly deformed. We took him in at once, corrected the deformity, and completely immobilized the joint. Next day he was comfortable. About six months ago he was discharged from hospital in a walking caliper, and is now quite the jolliest boy you could meet, but with a stiff knee!

These are not exceptional cases; they are just perfectly straightforward instances of what happens if these patients are not given early, effective, thorough, and continuous treatment, and it is for such cases as these that the special country open-air hospitals exist and are ready to fulfil their part in the work in which we are all engaged.

Admission for effective treatment must follow diagnosis without delay, and that treatment must be carried through until the patient is fit and well, and his joint in process of sound and thorough healing. But more than that is necessary, and the last part that must be played by our team is that of the thorough after-care and supervision of these children after they leave hospital. Here again our clinics are of the greatest possible value, and it was primarily for this work of after-care that this system was developed first of all by Miss Hunt in Shropshire. They quickly became useful for early diagnosis and treatment, too, and this system, which she originated, of a central hospital and scattered

local clinics supervised by the staff of the central hospital, provides means for getting into early touch with these cases when the condition is first suspected, bringing them under prompt effective treatment, and carrying out that treatment in hospital, and afterwards in the clinics again, with perfect continuity until the patient is permanently restored to health, strength, and activity.

Actual orthopædic supervision the hospital staff can do, but we must look to such work as that of your Association for the maintenance of that close touch with the home life of the patient which is necessary to ensure that his conditions are satisfactory, and that a cure is fully achieved and made permanent.

Surgical tuberculosis amongst children is a very different thing to phthisis. It develops sometimes quickly, sometimes insidiously, into a serious disease, painful, associated with much suffering, and the production of deformity and crippledom. It is sometimes fatal, but seldom so if treated promptly and effectively; and, once the condition is soundly healed, a large proportion of the cases remain perfectly well throughout the rest of their lives.

This, then, is the game our team is to play, and it is against an unscrupulous foe. Our forwards, led by the medical officer of health, are endeavouring to eliminate the causes of disease, whether by preventing actual infection, or altering the bad conditions and poor feeding which favour its success. Our half-backs must be quick to perceive the first sign of illness, and initiate defence. Our back division, which includes the doctor, the tuberculosis officer, the surgeon, and those who are responsible for hospital maintenance, are concerned with the developed attack. The field of play is very wide, the game ranges over streets, schools, and scattered cottages, and unchecked disease carries it into the hospitals. We must never forget that it is the actual bodies of the children that are at stake. The other side scores by their suffering, illness, and crippledom, and wins by their death; we, by the maintenance and restoration of their health and activity. Individual quickness and skill, loyal combination, and a spirit of fellowship in effort toward a common goal, will bring success, and make our lifelong game worth while.

Win or lose the People pay the expenses and bear the losses of the play. These losses, paid in suffering and deformity, will get less and less if the work is well supported. The choice lies before the country: on the one side is the maintenance of health, the restoration of activity, and, ultimately, the bread-winner; on the other side, illness, with crippled and dependent lives. The cost of the early active treatment is fully repaid in hard cash, and in other values many times over. We look to the Ministry of Health, the Local Authorities, and voluntary subscribers to carry on and develop the work. The duty has been

recognized by Parliament, all the necessary legislation has been passed, the machinery is ready and working, the team is trained and in the field. Surely only a Government misguided, a Press unenlightened, and a blindfold People can call a halt!

THE SCIENCE OF OPEN-AIR TREATMENT.¹

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IN considering the science of open-air treatment, the chemical purity of the air of a stuffy room must first be considered. The ordinary idea is that the stuffiness is due to the chemical impurities in the air, and that the benefits obtained from open-air treatment are owing to the fact of the air being chemically pure. So great, however, is the natural ventilation through chinks and crannies, set up by differences of temperature and humidity between the inside and outside air, that chemical impurity has nothing to do with the stuffiness. In the air of the worst ventilated rooms the amount of carbonic acid is very little more than the percentage which is present in the ordinary air. During the war it was often necessary to remain at the bottom of the sea as long as ever the occupants could live on the air enclosed in a submarine. The air of the submarine was kept cool by the sea water surrounding its steel body. Under these conditions it was found that the carbonic acid reached $3\frac{1}{2}$ per cent. before the men felt constrained to come to the surface, and the oxygen—of which ordinary air contains 21 per cent.—fell to below 17 per cent. When the conning tower was opened, such air struck a newcomer as fresh. Physiologists have proved that there is 5 to 6 per cent. of natural carbonic acid in the lungs, and the breathing is so adjusted by the breathing centre in the brain as to always keep this amount in the lungs, and therefore the amount of carbonic acid which occurs in ordinary closed rooms has no other physiological effect than to make one breathe a little more deeply. The only importance of estimating the amount of carbonic acid is

¹ This paper was read by Professor Leonard Hill in the dining-room of the Palace Hotel Sanatorium, Montana, Canton du Valais, Switzerland, on the evening of December 13, 1921, before a large audience, consisting principally of the English colony of Montana. Professor Hill had been carrying out research work at Montana in co-operation with Dr. Bernard Hudson, Resident Medical Superintendent, on the subject of metabolism at altitudes.

as a test as to how often the air has been changed, an adequate ventilation being necessary to keep the body cool.

In the matter of oxygen, owing to the altitude of the Alpine health resorts, the diminution of the weight of oxygen in each pint of air taken into the lungs as compared with breathing at sea-level is much greater than occurs in the stuffiest of rooms at sea-level. Men live at far higher altitudes on the Andes and in Thibet, and easily accustom themselves to a very considerable diminution of oxygen concentration. A great deal has been made of the supposed existence of a subtle organic poison exhaled in the breath; the experiments in favour of this have been proved wholly untrustworthy. There is no evidence that poison is exhaled in the human breath, and an offensive smell in a room does not prove that it is poisonous.

In consideration of the factors which make confined air harmful, it may be first pointed out that in spite of all the advancement in hygiene, and the considerable reduction in the death-rate which has taken place during the last fifty years, the proportion of healthiness of the agricultural people over the town people is as great now as it was fifty years ago. In Westmorland the expectation of life at birth of females is sixty-one years; in the manufacturing town of Middlesbrough it is only forty-six years. At twenty years of age the expectation of life is nine years greater in the county of Surrey than in the manufacturing town of Oldham. It is not, then, merely a question of greater infant mortality in cities. In considering the standard of health of various professions and occupations, the clergy come first with a very low death-rate, the agricultural labourer next, and then come the cotton-worker, the printer, the shoemaker, each with a considerably higher death-rate. In all the manufacturing trades, where people were forced to work under shut-up conditions, a much higher death-rate and higher phthisis-rate is shown than is the case with those people who very largely are employed in the open air. One of the great causes of mischief in closed conditions of work is the infection with pathogenic microbes by the carriers of disease, who massively infect others. A carrier of such organisms explosively scatters these out by speaking, coughing, and sneezing to quite a considerable distance, the danger zone being about one yard. The chance of the healthy person being infected is less with the windows and doors open, and, on the other hand, massive infection is increased where the ventilation is bad. Captain Douglas and the writer had studied the number of microbes settling on culture plates after a spray of organisms had been made, during certain periods of time, with the room ventilated and otherwise, the latter, of course, having a large majority.

Alpine air is strongly favoured owing to its being remarkably free from dust. While all dust is harmful, and produces asthma and bron-

chitis in late life, certain dusts are extremely injurious, especially one containing a chemical known as free silica, which is very harmful to the lungs. It occurs in quartz, granite, sandstone, etc., and, if continuously breathed, its effect upon the lungs is to produce a degeneration which very often becomes tubercular. The death-rate from phthisis of South African gold and Cornish tin miners is thus very high. There is one dust which shows no signs of being harmful—*i.e.*, coal dust; it is believed by some that coal dust actually counteracts the injurious effect of free silica, and that it stimulates the lungs to clean themselves. Much can be done in factories to protect the worker from dust; thus a suction dust plant can be used in close contact with a dust-producing operation. In this way disease, especially consumption, can be kept down.

Smoke pollution of the atmosphere hinders the coming through of the sunshine, covers with dirt cities and people, causing an enormous expenditure of human energy in cleaning, painting, and redecorating of buildings, and the cleansing of clothes; smoke fogs delay the transport of goods and people, with all the annoyance therefrom, and, above all, tell against health. It is estimated that from 75 to 90 per cent. of the thermal energy of the coal is wasted, so imperfect are the means of its utilization for producing power, light, and heat. The deposit at Southwark—39 tons per month per square mile—must be compared with that in a country district like Malvern, where it is only 7 tons. Dr. Owen's experiments show that the deposit from coal smoke in London begins at the time of the lighting of all the domestic fires; after all the fires have been lit the condition of the air becomes better, and at night it is nearly as good as in the country. The nuisance is almost as bad at the week-end as during the working part of the week. This proves that it is the domestic fires far more than the factories which cause the mischief, and, furthermore, that it is the lighting of the domestic fires which is the chief offence. If some way could be discovered of quickly rushing the newly-lit fire to a red heat, or if smokeless fuels, such as gas and coke, could be used, it would enormously lessen this dreadful pest. The deposit is far greater during a fog. In the centre of Leeds daylight is 40 per cent. less than in the outskirts. Destruction is wrought upon grass and plants of all kinds by coal smoke. Radishes and lettuces grown at stages between the centre and the suburbs of Leeds show enormous increases in size concomitantly with the greater distance between the producing ground and the city. Experiments in food show that there are present subtle principles known as vitamins, which are absolutely necessary for growth and health, and that these are found primarily in green food-stuff, milk of cows fed on such, eggs, and seeds. The want of these vitamins in the city is a great cause of ill health. People cannot live

healthily on bread made from white flour, in the grinding of which the miller has extracted the germ and outer layers containing the vitamins, margarine made of vegetable fats and nuts, and jam composed principally of syrup, which contain none of these vitamins. Fortunately, they are found in the potato. The agricultural labourer, in spite of his low wages, is better nourished than the inhabitant of the town, because he is able to obtain plenty of the green foods and other vegetables from his garden.

The physical properties of the atmosphere are of great importance to health. We are always consuming food and producing body heat, and we have to get rid of our body heat in order to keep ourselves at the normal body temperature. Hard muscular work produces far more heat. The skin is cooled by radiation of heat to colder surroundings and by convection—warming the air in contact with it. Wind greatly aids convection. There is, additionally, the emergency method of cooling the body by evaporation of water. Every gram of water evaporated when one sweats takes away 600 calories of heat. The air which one breathes in, no matter at what temperature nor what moisture it may contain, is heated up to almost body temperature, and saturated with water at that temperature. The important thing is to keep up the health of the respiratory membrane, and this depends upon the amount of arterial blood and lymph flowing through it. During the winter at an Alpine resort such as Montana, where the air is freezing during many hours of the day, and at no time more than ten degrees above freezing-point, the excessively dry air that one breathes in, having very little moisture in it, holds a great deal of moisture when heated up to body temperature; instead of holding some 5 grams of moisture per cubic metre when evaporated from the respiratory membrane, it may hold from 35 to 40 grams of water. A person living in Alpine sanatoria, taking exercise and lying in the open air, may evaporate from this membrane in twenty-four hours several times the amount of moisture which he would if living a sedentary life indoors in London. This is a matter of great importance, as the flow of moisture going through the membrane cleanses it, protects it from disease, and helps to cure cases of tuberculosis by sending more lymph and blood through the respiratory tract.

The cool Alpine air evaporates moisture not only from the respiratory membrane, but also from the skin; hence the dryness of the skin and lips, and their tendency to chap. In the case of hard work one has to perspire to keep cool, for the heat production of the body may be five to ten times greater than during rest. In the cold Alpine air in the shade it is possible to take heavy exercise, such as climbing, without sweating; the heart is thus saved from extra work, and the patient is stimulated to exercise and enjoys it more.

In dry, hot atmospheres sweating keeps the body temperature normal, but heat-stroke results if the sweat glands become exhausted through fatigue or illness. Heat-stroke can then be prevented by spraying the patient with water and blowing on him with a fan.

In hot, moist atmospheres loss of heat by evaporation becomes very difficult or impossible; heat-stroke is inevitable in the latter case. Warm, moist atmospheres lower health and working efficiency very greatly—*e.g.*, the climate of Singapore. The metabolism of native students at Singapore is not half that of an athletic Oxford undergraduate.

The ordinary thermometer, which is so trusted, merely gives the average temperature of its surroundings. While the human body produces heat, and all day long is keeping itself at body temperature, the thermometer does not produce heat, but just registers the effect of the surrounding atmosphere upon itself. An instrument is needed, then, to record how quickly air is cooling and evaporating moisture from the body. The writer had introduced the Kata thermometer, a sensitive instrument, and one that was considered far more indicative of human feeling than the ordinary thermometer. The Kata thermometer was simple and easy to use; it recorded not only the effect of the temperature of the surrounding air on the cooling of a surface at body temperature, but of the wind and any movement of the air, and also how quickly cooling takes place when the surface is wet, as the skin is when perspiration is going on. The Kata is a large-bulbed alcohol thermometer of standard size with stem graduated from 100° to 95° F. It is warmed up in hot water till the meniscus rises above 100° F.; the bulb is then dried, and the rate of cooling of the meniscus from 100° to 95° F. taken with a stop-watch. From a factor number determined for each instrument the cooling power is deduced in millicalories ($\frac{1}{1000}$ gram calorie) per sq. cm. (of Kata surface at body temperature) per second. In still air the dry Kata thermometer has a cooling power of 10 at 0° C. and about 5 at 20° C.; with a wind of nine miles per hour it has a cooling power of 40 at 0° C. and 20 at about 15° or 16° C., and so on with different rates of wind. Wind is far more important than temperature to the cooling of the body; thus the still, dry air of the Alpine climate is easily borne. In the case of the wet Kata thermometer a wet muslin glove covers the bulb. The difference between the dry and wet Kata readings gives the evaporative power of the air acting on its surface, which is at body temperature. In factories, schools, etc., the reading of the cooling power by the dry Kata thermometer should not be less than 6 with a temperature of about 60° F., otherwise the efficiency of the worker and pupil will tend to go down. Observations made by the Industrial Fatigue Board researches in pottery, boot and shoe, cotton, and printing

works showed that a great number of readings were below 6. The general mortality increased in these trades with the lowness of the Kata readings. Great improvements could yet be made in this respect, and industrial unrest is to be attributed not so much to the wage question as to the working conditions of life—the confined air, filthy, smoky atmosphere, lack of gardens, playing fields, etc. If factories were properly swept with moving air the risk of massive infection would be taken away, and the workers stimulated to work and kept in better health. The heat production of the body must not be brought down too low; one must guard against over-blanketing the body with clothes and still, warm, moist air. If one lives in the tropical climate of warm rooms and does not take exercise, one does not breathe deeply, there is feeble circulation of the blood, and the abdominal organs are not massaged as they should be to keep the bowels moved. All these evils arise from a sedentary, confined life, where people are not stimulated to digest their food, and either over-eat or their appetite goes, and they become thin, weakly, and susceptible to disease. It is necessary to keep the heat production of the body active; the “lamp of life” should burn vigorously.

Experiments carried out by the writer and Dr. Argyll Campbell during the previous summer at Lord Mayor Treloar Cripples' Hospital at Alton, Hampshire, on children under the care of Sir Henry Gauvain showed that the heat production is kept at a high level as the children lie on cots in the open air exposed to the wind and sun. Their heat production was put up something like 40 to 50 per cent. over children resting in a chamber, making their muscles strong and firm. Many experiments upon patients had been made at Montana by the writer with the co-operation of Dr. Bernard Hudson, physician in charge of the English Sanatorium; Dr. Chassot, physician in charge of the Belgian Children's Clinique; and Dr. Betchow, physician in charge of the Sanatorium Populaire Genevois. All these experiments told the same story—that in Montana the heat production of the resting subject was put up to a notable degree higher than was the case with the children at Alton in summer, but not higher than with the latter on cold winter days. The winter sun in the clear air at Montana had been found to raise the surface temperature of a dark wool or fur coat to 50° to 60° C., while the temperature of the air was only 10° C. The patients absorb and enjoy the radiant warmth of the sun; meanwhile the cool air is surrounding and cooling the shaded parts of their bodies. Heat production of clothed adults is put up about 50 per cent., and in the case of children quite 100 per cent., and in some instances more, above that of those resting in a confined chamber. The appetite is thus greatly increased, and as the digestion and absorption of food improve, far more food principles, vitamins, etc., become avail.

able for resisting disease. The "Montana appetite" is a well-known phenomenon.

The sun warmed diseased parts, and, evaporating moisture from sores and issues, maintained a greater flow of blood and lymph through these parts. The cool, dry air also increased such evaporation, etc. How far the luminous sun rays benefited health by penetrating to and being absorbed by the blood was not yet known. Ultra-violet rays were absorbed by the surface and did not penetrate. The sun caused pigmentation of the skin, and the pigment prevented sunburn. Patients required to be gradually exposed to the sun and allowed to pigment; they must not be sunburnt or overheated. Febrile cases of phthisis must not, then, be exposed to the sun. Efforts were being made by the writer and Sir Henry Gauvain to continue the cure on sunless days in England by the application of glowing red electric heaters, by which the cooling power out of doors could be maintained and the child kept comfortable by radiant heat. Coke fires also were being tried out of doors on the shingle beach at the Hayling Island Treloar Hospital. The sun, or the stoves and fires, kept the children comfortable and happy out of doors.

THE HISTORY OF HORSE-RIDING IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

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GRADUATED exercise and work play so important a part in the modern treatment of certain cases of pulmonary tuberculosis that some interest may attach to a brief glance at the time when horse-riding was recommended, not merely as a serviceable adjunct to other remedies, but as an absolute specific in any and every stage of the disease.

The first to advise horse-riding in this particular capacity was no less an authority than Thomas Sydenham (1624-1689). His principal statements on the subject appeared in the first edition of "*Dissertatio Epistolaris Ad. . . . Gulielmum Cole, M.D., etc.*" (1682). They were slightly amplified in later editions.¹ A few additional remarks of relatively less importance were published posthumously in a work entitled "*Processus Integri*," which was written for his son, Dr.

¹ First edition, London, 1682; second edition, London, 1685.

William Sydenham.¹ The chief passages are as follows, the English translation adopted here being that of J. Swan:² "... The principal assistant in the cure of this disease is riding on horseback every day, insomuch that whoever has recourse to this exercise in order to his cure, need not be tied down to observe any rules in point of diet, nor be debarred any kind of solid or liquid aliment, as the cure depends wholly upon exercise. Some persons that have been recover'd by this method have been seiz'd with a tumor in the neck, not much unlike those in the king's evil."³

Furthermore, Sydenham stated that riding "is not more beneficial to hypochondriac than to consumptive subjects, of which distemper several of my relations have been cured by riding long journeys by my advice. For I was well assured that no other method or medicines were more effectual. Nor is riding on horseback only proper in slight indispositions, accompanied with a frequent cough and wasting, but even in confirmed consumptions, wherein the looseness is succeeded by night-sweats, which are the general forerunners of death, in those who perish by this disease. In fine, how desperate soever a Consumption may, or is esteem'd to be (two-thirds of such as die of chronic diseases being destroy'd thereby), yet I solemnly affirm, that riding is as effectual a remedy in this distemper as mercury in the lues venerea, or the bark in intermittents; provided the patient be careful to have his sheets well aired, and takes sufficiently long journeys. But it must be observed that such as are past the prime of life, must continue the use of riding much longer, than such as are not yet arrived at that age; which I have learnt from much experience, that scarce ever failed me; and tho' riding on horseback does most service in consumptive cases, yet riding in a coach does sometimes produce surprising results."⁴

Sydenham's works were written in Latin, and the expression "consumptive subjects" in the second extract was rendered in the original by the terms "tabes" and "phthisis."⁵ The point is of importance, for numerous forms of "consumption" were recognized during his lifetime.⁶ "Nervous consumption" was defined, even as late as the year 1803, as a "wasting of the body, without any remarkable fever, cough, or difficulty of breathing; but attended with want of appetite

¹ First definite edition, London, 1693. Many later ones.

² "The Entire Works of Dr. Thomas Sydenham." Second edition, London, 1749.

³ "Processus Integri." Fifth edition. London, 1726, pp. 98, 99 (Latin). Swan's translation (second edition), p. 623.

⁴ "Dissertatio epistolaris," etc.; 1682, pp. 166, 167 (Latin). Only the first part of this extract appears in the first edition, but it appears in full in later editions, such as "Opera Universa." Third edition. London, 1705, pp. 383, 384. Swan's translation (second edition), pp. 402, 403. The italics in the original have been omitted.

⁵ "Neque magis Hypochondriacis prodest hoc exercitii genus, quam Tabidis Phthisicisque," etc., *op. cit.*, 1682, p. 166.

⁶ Cf. R. Morton, "Phthisiologia." London, 1694.

and a bad digestion."¹ "Hypochondriacal consumption" denoted nervous dyspepsia associated with cachexia and hysterical symptoms.² But there is little doubt that the various kinds of "consumption" treated by Sydenham included cases of genuine pulmonary tuberculosis, as is shown by the symptoms enumerated in the extract which appears above.

Even when every allowance has been made for the very great probability that many of Sydenham's successful cases were not tuberculous at all, it is still difficult to comprehend how the utterly indiscriminate use of riding proved sufficiently salutary to warrant his wholehearted recommendation. His statements, although brief, were so emphatic that the difficulty is not solved by the fact that they were made in a work which did not deal exclusively with "consumption," and would doubtless have been amplified later if their author had lived to write the special treatise upon the disease intended at the time of his death.³ But there must be some explanation, and the most probable one is that the benefits occasioned by riding in cases of genuine phthisis were due to exposure to fresh air, which the patients would otherwise have been denied; in other words, that the really crucial factor was not the actual exercise, but aeration. This, however, does not seem to have been the opinion either of Sydenham himself or of his followers. They laid great stress upon the physiological effects of riding as such, relatively little upon fresh air, and thereby appear to have missed the mark entirely.

There is no doubt that Sydenham was responsible for introducing horse-riding as a remedy for pulmonary tuberculosis. It is true that exercise, both active and passive, had been prescribed in this disease during the period of classical antiquity;⁴ but riding had been used sparingly, and only as an auxiliary to other measures. Indeed, Antyllos, who flourished at the beginning of the second century A.D., specifically stated that riding was most injurious to the chest.⁵ Moreover, that this particular exercise was not in general use at the end of the seventeenth century can be inferred from the well-known work "Phthisiologia," by R. Morton, of London (1637-1698). This treatise was published five years after Sydenham's death, and contains no allusion whatsoever to riding. If the latter had been a customary remedy, Morton would undoubtedly have mentioned it, if only for the purpose of condemning it. Finally, Sydenham's contemporaries, who

¹ "The Edinburgh Practice of Physic, Surgery, and Midwifery," vol. ii. London, 1803, pp. 462, 463.

² Cf. "A System of the Practice of Medicine, from the Latin of Dr. Hoffmann," W. Lewis and A. Duncan. Two vols. London, 1783, vol. ii., p. 60.

³ "Processus Integri." Preface.

⁴ Celsus, "De Medicina," Lib. III., c. xxii.

⁵ Quoted by Oreibasios, "Collectanea Medicinalia" (Lib. VI., c. xxiv.), from the perished work of Antyllos, "De Auxiliis quæ fiunt."

were best qualified to offer an opinion upon the question, all regarded his method as original. They associated it with his name, and referred to no earlier literature upon the subject, with the sole exception of that of the period of classical antiquity.¹

The new remedy attracted attention first upon the Continent. The earlier reports of its employment by G. Baglivi, of Rome² (1668-1707), G. E. Stahl, of Halle (1660-1734), the originator of the "Phlogiston" theory of combustion,³ and J. P. Lasalle,⁴ were uniformly favourable. Sydenham's fame in England was posthumous, but as soon as his writings began to be widely known, which they did at the beginning of the eighteenth century, riding became as popular a remedy for phthisis in this country as it already had been for some years abroad. It is credited with having cured John Wesley⁵ (1703-1791), and was strongly advocated by several writers, notably F. Fuller (1670-1706), who recommended riding or carriage exercise, not only in phthisis, but in many other chronic diseases. His book on the subject, published in London in 1705, was entitled "*Medicina Gymnastica: or a Treatise concerning the Power of Exercise, with Respect to the Animal Economy, and the great Necessity of it in the Cure of several Distempers.*" It was an emphatic success. No less than nine editions were issued, the last in 1777.⁶ The book possesses little intrinsic value, but it appealed to the lay public, and thereby assisted to disseminate Sydenham's opinions.

So great an interest was now aroused in the subject that several academical theses dealing with the use of riding in phthisis and chronic diseases generally were issued from the Dutch and German Universities.⁷ But it was soon found that the new remedy possessed most serious disadvantages. The literature contains little direct information concerning the disasters which must have ensued from treating all

¹ E. A. Otto, "*Motum optimam corporis medicinam,*" etc. Halle, 1701, § 17. J. A. Zellmann, "*De Commodis exercitationis corporis.*" Wittenberg, 1705, § 18.

² "*De Praxi Medica.*" Rome, 1696, pp. 115, 116.

³ "*Propempticon inaugural de novo specifio anti-phthisico, equitatione.*" Halle, 1699.

⁴ "*Traité des maladies de la poitrine.*" Bordeaux, 1704, p. 160.

⁵ M. J. Chapman, "*Lings' Educational and Curative Exercises.*" Fourth edition, edited by C. A. Georgii. London, 1875, p. 14.

⁶ All the editions were published in London. Second edition, 1705; third, 1707; fourth, 1711; fifth, 1718; sixth, 1728; seventh, 1740; eighth, 1771; ninth, 1777. The sixth was translated into German. Lemgo, 1750. J. Addison referred to this book in the *Spectator*, July 12, 1711.

⁷ (1) C. F. Breitenbach, "*Dissertatio academica de equitationis eximio usu medico.*" Leipsic, 1713. Another edition by C. M. Adolphi, "*De equitationis eximio usu medico dissertatio.*" Leipsic, 1729. (2) D. Van Heemskerck, "*Thema gymnastico-medicum inaugural de equitatione.*" Leyden, 1734. (3) J. P. Erpel, "*De Commodis et incommodis equitationis in hominum sanitatem redundantibus,*" etc. Halle, 1749. (4) G. G. Richter, "*Prolusio de salutari, limitando tamen, equitationis exercitio.*" Göttingen, 1757. (Included in G. G. Richter's "*Opuscula Medica.*" Edited by J. C. G. Ackermann. Frankfort and Leipsic. Vol. iii., 1781, pp. 367-391.)

and sundry cases of pulmonary tuberculosis on the lines indicated by Sydenham; but that disasters did actually occur is shown by the reaction which set in during the third decade of the century. F. Hoffmann, of Halle (1660-1742), declared that riding was absolutely dangerous in cases either of extensive disease or in which the presence of cavities was feared, and that it not infrequently caused hæmoptysis. He therefore prescribed it only in "hypochondriacal consumption."¹ E. Strother (d. 1737), of London, expressed a very similar opinion.² Sir R. Blackmore (d. 1729), of London, found riding serviceable under certain conditions, but denied the virtues attributed to it by Sydenham.³ S. T. Quelmalz, of Leipsic (1696-1758), found that it failed in bad cases, but ameliorated some symptoms.⁴

As has been mentioned already, its beneficial effects were ascribed to the exercise as such rather than to fresh air, and this opinion led to the suggestion that similar results could be achieved by means of machinery. P. Desault, of Bordeaux (1675-1737), admitted that the country air had "its share," but attached relatively so little importance to it that he proposed rocking patients at home in a bed or armchair which was suspended by springs.⁵ He does not seem to have used a machine of this kind himself, but a rocking-horse, swung from the ceiling by ropes, was actually constructed and employed by S. T. Quelmalz, who claimed that his apparatus possessed manifold advantages over a real horse.⁶

Another attempt in a similar direction was made by J. C. Smythe (1741-1821), physician to the Middlesex Hospital. He erected a swing in the grounds, and treated fourteen patients with it in 1786 or 1787. Twelve were cured, one was improved, and one died. The following is his account of a successful case: "Elizabeth Berger, forty-five years of age, was admitted on the 20th of September with febrile symptoms; she had also a cough, shortness of breath, spitting of purulent matter, night-sweats, etc. Pulse 128. She had caustics applied on her breast, took some medicines, and on the 23rd went into the swing: after swinging gently for half an hour, during which time she was free from cough, her pulse fell eight pulsations in the minute. She continued to swing twice a day when the weather was favourable, and always with the same good effect. The fever and night-sweats left her, the coughing and spitting became less considerable, and on the 11th of October

¹ "Opera Omnia." Geneva, 1740, etc., vol. iii., p. 294.

² "An Essay on Sickness and Health." London, 1725, pp. 255, 275, etc.

³ "A Treatise of Consumptions and other Distempers belonging to the Breast and Lungs." London, 1724, p. 134 *et seq.*

⁴ "Novum sanitatis præsidium," etc. Leipsic, 1735, § 27.

⁵ "Dissertation sur les maladies veneriennes," etc., including "Dissertation sur la phthisie." Bordeaux, 1733, pp. 331-412.

⁶ *Op. cit.*, 1735.

she was dismissed from the hospital, with a pulse between 70 and 80, and free from complaint."¹

Smythe's results led him to infer that sea voyages benefited cases of phthisis solely by means of the motion of the ship, since sea air itself possessed "noxious effects." He stated that swinging should be undertaken preferably in the open air, but that a patient could swing in his own bedroom if he liked.² Other observers, however, failed to confirm his results, and his method was speedily forgotten. R. T. H. Laennec (1781-1826) regarded it as useless.³

Very few practitioners of the latter half of the seventeenth century regarded horse-riding as a specific for phthisis—the present writer has succeeded in tracing only one, T. Marryat, of Bristol (1730-1792). "Let the patient," he said, "ride on horseback every morning; if too weak to sit alone, he must be supported by one that rides behind him, for riding in a morning is absolutely necessary."⁴ But the vast majority of physicians prescribed riding in a very restricted manner, if at all. C. J. Tissot, of Paris (1750-1826), stated that it was of benefit only if it lessened cough, made the patient feel stronger, relieved any feeling of oppression in the chest, and reduced the pulse-rate.⁵ T. Beddoes, of Clifton (1760-1808), saw two cases which appeared to justify Sydenham's contention, but considered that the quality and quantity of exercise should be regulated in accordance with the patient's general condition and with the effect produced upon the pyrexia.⁶ T. Dickson, of London (1726-1784), stated that riding should be undertaken only in the morning, being usually injurious at other times.⁷ P. Camper, of Amsterdam (1722-1789), considered it suitable only in early cases.⁸ S. F. Simmons, of London (1750-1813), saw more than one case in which riding accelerated death, and thought that Sydenham's advice had done much harm from too general adoption.⁹ T. Reid, of Bath (1739-1802), stated that riding unassisted by other remedies never cured phthisis,

¹ "An Account of the Effects of Swinging employed as a Remedy in the Pulmonary Consumption and Hectic Fever." London, 1787. Case XII., pp. 44, 45.

² *Op. cit.*, pp. 4-7, 51, 52.

³ "Traité de l'auscultation médiate et des maladies des poudrons et du cœur." Second edition, vol. i. Paris, 1826, p. 715.

⁴ "Therapeutics." Twenty-fourth edition. London, 1816, p. 39. (First edition in Latin, 1758.)

⁵ "Medicinsk och chirurgisk gymnastik." Stockholm, 1797, pp. 200-205. (Swedish translation of the French original, "La gymnastique médicinale et chirurgicale," etc. Paris, 1780.)

⁶ "Essay on the Causes, Early Signs, and Prevention of Pulmonary Consumption." Second edition. London, 1799, pp. 276, 277.

⁷ "Observations on the Cure of an Hæmoptoe," etc., "Medical Observations and Inquiries." Vol. iv. London, 1771, pp. 206-213.

⁸ "Dissertationes decem quibus ab illustribus Europæ præcipue Galliæ, Academicis Palma adjudicata." Two vols. Lingen, 1798-1800, vol. i., p. 388.

⁹ "Practical Observations on the Treatment of Consumptions." London, 1780, pp. 53-60.

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and that its indiscriminate use very frequently aggravated the disease.¹ J. Von Quarin, of Vienna (1733-1814), disapproved of it entirely.²

At the beginning of the last century riding sank into final oblivion as the principal indication in the treatment of pulmonary tuberculosis. It affords a striking and instructive example of a remedy which at first appeared to succeed brilliantly, then failed to fulfil the expectations that it had aroused, and ultimately took its proper place in therapeutics as a serviceable auxiliary to other measures. The history of medicine abounds with examples of this strange phenomenon, for which no really satisfactory explanation appears to be forthcoming.

¹ "An Essay on the Nature and Cure of the Phthisis Pulmonalis." London, 1782, pp. 121-126.

² "Animadversiones practicae in diversos morbos." Padua, 1792, p. 68.

INSTITUTIONS FOR THE TUBERCULOUS.

THE CHILDREN'S SANATORIUM AND RESIDENTIAL SCHOOL, HARPENDEN.

THE Children's Sanatorium of the National Children's Home and Orphanage is an ideal home, hospital, school, and country play centre for tuberculous children and boys and girls threatened with tuberculosis. At its opening in the summer of 1910 Sir Thomas Barlow, K.C.V.O., M.D., then President of the Royal College of Physicians, said: "I venture



GENERAL VIEW OF THE SANATORIUM OF THE NATIONAL CHILDREN'S HOME, HARPENDEN.

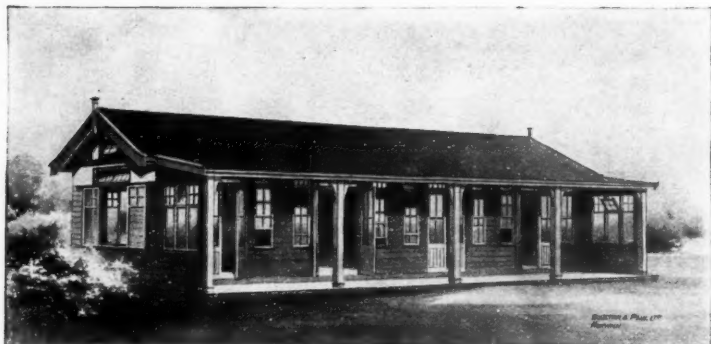
to foretell that from this sanatorium and its work there shall arise in years to come enlightened effort for poor children in general, which will make their lives more wholesome, more healthy, and more blessed than anything which we can now realize." This prophecy has been abundantly fulfilled. The Children's Sanatorium at Harpenden may well claim to be a unique institution, and it has served as a model which has inspired other good work for necessitous and tuberculous children. During the past twelve years the sanatorium has undergone considerable development.

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In Sir George Newman's last report as Chief Medical Officer to the Board of Education the open-air school of the Harpenden Sanatorium



THE OPEN-AIR SCHOOL OF THE CHILDREN'S SANATORIUM, HARPENDEN.



THE NEW OPEN-AIR BUNGALOW OF THE CHILDREN'S SANATORIUM, HARPENDEN.

has first place in the list of residential sanatorium schools for children suffering from pulmonary tuberculosis, having been approved by the Ministry of Health, September 2, 1912.

The institution is primarily intended to meet the needs of cases of tuberculosis arising in connection with the 4,000 children now resident in the various branches of the National Children's Home and Orphanage; but when beds are available other little patients are received, and so enjoy the exceptional advantages of home and school influence which this country sanatorium is able to provide. Recently a charming open-air bungalow has been opened. It has been designed and constructed by Messrs. Boulton and Paul, of Norwich. It is 40 feet long, 18 feet wide, and has a height of 8 feet at the eaves. The walls are framed together in sections clad with 1-inch rebated and moulded weather boarding. The sections are bolted together, and so can easily be removed should it be found desirable at any time to alter the position of the chalet. The roof is covered with three-ply ruberoid grooved and tongued match-boarding. The floor consists of 1-inch rebated boards nailed to 4-inch by 2-inch joists. A concrete floor is provided for the verandah. The upper panels of the door are glazed, and a fanlight is placed over each door. The windows are constructed to allow of the maximum of light and ventilation. The general appearance is indicated in the accompanying illustrations. Doubtless these details will be of service to other institutions desiring to provide effective and economic extensions. Certainly the new structure at Harpenden is in every way an admirable adjunct. Medical and educational advisers desirous of securing model conditions for the physical and mental development of tuberculous and tuberculously disposed children should visit the Children's Sanatorium at Harpenden.¹ Visitors are always welcome.

¹ The Children's Sanatorium at Harpenden is situated on high ground, about twenty minutes' walk from Harpenden Station on the Midland main line, and so can be easily reached from London and the towns in the Midlands and North. Full particulars regarding admission can be obtained on application to the Principal (Rev. W. Hodson Smith), National Children's Home and Orphanage, 104-122, City Road, London, E.C. 1. Plans, illustrations, and full particulars will be found in "The Year Book of Open-Air Schools and Children's Sanatoria," edited by Dr. T. N. Kelynack. London: John Bale, Sons and Danielsson, Ltd.

NOTICES OF BOOKS.

PULMONARY TUBERCULOSIS.

SIR JAMES KINGSTON FOWLER has written a notable monograph on tuberculosis of the lungs.¹ It embodies the conclusions arrived at after a long period of clinical observation and intimate study of medico-sociological aspects of the tuberculosis problem. It is primarily intended for undergraduate and post-graduate students, but it deserves the thoughtful consideration of all who are interested in the diagnosis and treatment of pulmonary tuberculosis. The author opens with a valuable review of the history of his subject, and extensive references are made to the writings of William Stark, William Budd, and others. Then follow chapters on the Rôle of Heredity and Infection, the Relation of Para-tuberculosis (Scrofula, Bovine Tuberculosis) to Tubercle and Pulmonary Tuberculosis, the Incidence of Tuberculosis upon the Population of the United Kingdom and the Death-rate from the Disease. After these come a series of excellent sections on the pathology and diagnosis of pulmonary tuberculosis and the varieties of the disease and their classification. The descriptions of symptoms and physical signs will be found of much practical service, and the chapters on prognosis and treatment are just such as will prove helpful to tuberculosis officers and other young medical practitioners called to deal with this perplexing and frequently intractable disease. The work is effectively illustrated. The author is outspoken, critical, and his aim has evidently been to produce a thoroughly practical handbook. Many a page is illuminated by personal experiences and views, while some of the opinions expressed are no doubt to be considered open to discussion. In matter, arrangement, and style the work is excellent, and will meet a real need. The concluding chapter, containing the author's *obiter dicta*, is a novelty which many will delight in. We venture to quote the following: "A tuberculosis dispensary that has become a 'tuberculin' dispensary has become a dangerous place"; "A stethoscope is easier to carry than a cardiograph or an X-ray installation"; "Whosoever announces the earliest symptoms of disease must not expect a warm welcome"; "A diagnosis hospital is one of the great medical needs of London"; "Artificial pneumothorax is the only advance in the treatment of pulmonary tuberculosis since the introduction of sanatorium treatment as carried out at Nordrach"; "Those who wish to be original should avoid much reading"; "We are told, but are not obliged to believe it, that innumerable apparently perfectly healthy individuals are now spreading the infection of tuberculosis"; "No fool is ever cured of tuberculosis of the lungs." The appendix contains a list of public and private sanatoria in England, Wales, and Scotland for the treatment of pulmonary tuberculosis.

¹ "Pulmonary Tuberculosis." By Sir James Kingston Fowler, K.C.V.O., C.M.G., M.A., M.D., D.Sc., F.R.C.P., Consulting Physician to the Middlesex Hospital, the Hospital for Consumption and Diseases of the Chest (Brompton), King Edward VII. Sanatorium, Midhurst, etc. Pp. xiv + 284, with 52 illustrations. London: Macmillan and Co., Ltd., St. Martin's Street. 1921. Price 20s. net.

A TREATISE ON DISEASES OF THE CHEST.

Tuberculosis officers and those whose duties call them to investigate and advise in regard to patients who are the subjects of pulmonary tuberculosis are in danger not only of diagnosing tuberculosis where it does not exist, at all events in an active form, but of overlooking other morbid conditions giving rise to symptoms of derangement of the organs of the chest. A proper and most convenient corrective is to be found in the systematic study of such a general treatise as "Diseases of the Chest," as has been provided by Drs. Norris and Landis. The work is now in a second and thoroughly revised edition.¹ The main aim of the authors has been to provide "a practical book on the physical diagnosis of the heart and lungs in health and disease," and they have succeeded in a masterly manner. The book has met with such favour that a new edition has been called for in less than two years from its first publication. Special attention has been devoted to much-discussed questions of diagnostic acoustics. A striking feature of the volume is the remarkable series of photographs of frozen sections of the chest; these are most instructive, and will be of exceptional value in teaching students. The whole work is lavishly illustrated, and indeed forms a veritable album of illustrations of morbid conditions involving the chest. Tuberculosis of the lungs is dealt with at length. The following good general working rule is set out in italics: "In every individual who presents himself with symptoms referable to the thorax the possibility of the trouble being due to tuberculosis must always be considered, no matter whether the affection is acute or chronic." This section is admirably illustrated; the photographs of actual specimens of tuberculous lung are particularly good. A number of instructive temperature charts also appear. The diagnostic features of the various forms of the disease are effectively presented. As regards the diagnostic importance of sputum examination, it is stated that: "In the earliest stage of tuberculosis the sputum will be found negative for tubercle bacilli in from 60 to 75 per cent. of cases," and the warning is added: "Many practitioners fail to realize this, and are satisfying both themselves and the patient that tuberculosis is not present as the result of one or two negative examinations." With regard to the use of X-ray examination in diagnosis the following view is expressed: "What is needed beyond everything else to establish the true status of the X-rays in pulmonary disease is the anatomical corroboration of such findings. Anatomical proof was the foundation upon which the art of physical diagnosis was reared. Until this proof is forthcoming it is inevitable that differences of opinion will occur. Such proof can be furnished only by combining the observations of the clinician, the radiographer, and the pathologist." This handsome and eminently informing and serviceable volume should have a place in the library of every physician dealing with chest cases.

¹ "Diseases of the Chest and the Principles of Physical Diagnosis," by George William Norris, A.B., M.D., Assistant Professor of Medicine in the University of Pennsylvania, etc., and Henry R. M. Landis, A.B., M.D., Director of the Clinical and Sociological Departments of the Henry Phipps Institute of the University of Pennsylvania, etc. With a chapter on the Electrocardiograph in Heart Disease, by Edward B. Krumbhaar, Ph.D., M.D., Assistant Professor of Research Medicine in the University of Pennsylvania. Second edition, revised. Pp. 844, with 433 figs. Philadelphia and London: W. B. Saunders Company. 1920. Price 45s. net.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Medical practitioners, especially such as are called to deal with a disease like tuberculosis, in which much further research is required, will be well advised to make a point of reading the lives of scientists and medical worthies. We would specially direct attention to the intensely interesting life of Metchnikoff which has been written by his widow.¹ Sir Ray Lankester, in his preface, claims that it is "the picture of the development of a single-minded character absolutely and tenaciously devoted to a high purpose—the improvement of human life." Madame Metchnikoff has provided a simple, revealing, charming record of the visions, struggles, and adventures of a rare and original scientist, unselfish, gentle, courteous, and energized by a great purpose. The book tells of his toils and travels, his lectures, writings, researches, and scientific aims and methods. There is, of course, much that relates to Metchnikoff's doctrine of phagocytosis and his work on intestinal flora, but there is also an interesting reference to his studies on tuberculosis among the Kalmuk population. According to Metchnikoff, "a *natural* vaccination takes place among us against tuberculosis which would explain the resistance of the majority of human beings in spite of the enormous diffusion of the disease. He concluded that some attenuated breeds of microbes become introduced into our organism during our childhood, thus vaccinating us against the virulent tuberculous bacillus. . . . His hypothesis would explain the liability of the Kalmuks, since, if no tuberculous bacilli existed in the Steppes, the inhabitants could not acquire a natural vaccination. When placed in an environment which was not free from tuberculosis, they became infected very easily, being in no wise prepared for the struggle against the virus." The whole book is full of fascination for the scientifically-minded reader.

The Jubilee Historical Volume recently issued by the American Public Health Association is a remarkable collection of studies by leading medical advisers in the United States.² The Foreword to this notable production contains a quotation from Sir William Osler which we venture to reproduce, as it will be specially enlightening to medico-sociological students dealing with such a problem as that of tuberculosis: "For countless generations the prophets and kings of humanity have desired to see the things which men have seen, and to hear the things which men have heard, in the course of this wonderful nineteenth century. To the call of the watchers on the towers of progress there has been the one sad answer: 'The people sit in darkness and in the shadow of death.' Politically, socially, and morally the race has improved, but for the unit, for the individual, there was little hope. Cold

¹ "Life of Elie Metchnikoff, 1845-1916." By Olga Metchnikoff. With a Preface by Sir Ray Lankester, K.C.B., F.R.S. Pp. xxiii+297, with portrait frontispiece. London: Constable and Co., Ltd., 10 and 12, Orange Street, W.C. 2. 1921. Price 21s. net.

² "A Half-Century of Public Health: Jubilee Historical Volume of the American Public Health Association in Commemoration of the Fiftieth Anniversary Celebration of its Foundation, New York City, November 14-18, 1921." Edited by Mazyck P. Ravenel, M.D., President. Pp. xi+461. With portrait frontispiece of Stephen Smith, M.D., Founder and First President. New York: American Public Health Association, 1921.

philosophy shed a glimmer of light on his path, religion in its various guises illumined his sad heart, but neither availed to lift the curse of suffering from the sin-begotten son of Adam. In the fullness of time, long expected, long delayed, at last science emptied upon him from the horn of Amalthea blessings which cannot be enumerated, blessings which have made the century for ever memorable, and which have followed each other with a rapidity so bewildering that we know not what next to expect." The bulky volume is such a treasury of facts, figures, suggestions, and stimuli that it seems hopeless to attempt more than an enumeration of the chief articles: "The History of Public Health, 1871-1921," by Dr. Stephen Smith; "The American Public Health Association, Past, Present, Future," by Dr. Mazýck P. Ravenel; "The Story of Public Health in Canada," by Dr. Peter H. Bryce; "The History of Bacteriology and its Contribution to Public Health Work," by Frederick P. Gorham; "American Mortality Progress during the Last Half-Century," by Dr. Frederick L. Hoffman; "The United States Quarantine System during the Past Fifty Years," by Dr. Hugh S. Cumming; "History of State and Municipal Control of Disease," by Dr. C. V. Chapin; "Fifty Years of Water Purification," by George C. Whipple, C.E.; "Sewage and Solid Refuse Removal," by Dr. Rudolf Hering; "Stream Pollution by Industrial Wastes and its Control," by Earle B. Phelps, B.S.; "Progress in Federal Food Control," by Dr. Carl L. Alsberg; "Food Conservation," by Samuel C. Prescott, S.B.; "Milk and its Relation to Public Health," by Dr. Charles E. North; "The History of Child Welfare Work in the United States," by Dr. Philip Van Ingen; "Housing as a Factor in Health Progress in the Past Fifty Years," by Lawrence Veiller, A.B.; "What Fifty Years have done for Ventilation," by George T. Palmer, D.P.H.; "History of Industrial Hygiene and its Effect on Public Health," by Dr. George Marline Kober; "Fifty-Year Sketch History of Medical Entomology and its Relation to Public Health," by Dr. L. O. Howard; "The History of Public Health Nursing," by Lavinia L. Dock, R.N.

Tuberculosis officers and other medical practitioners devoting themselves to a speciality have need to be watchful lest they become restricted in their outlook and limited in their powers of diagnosis and medical service. All keen medical superintendents of sanatoria and all up-to-date tuberculosis officers will be well advised to study Dr. Tidy's admirable "Synopsis of Medicine," a second and revised edition of which has just appeared.¹ This compact, condensed, carefully arranged epitome of the essentials of present-day medicine provides an ideal reference book for the busy practitioner. Conscientious students who have earnestly worked through such a classical textbook as Osler's "Principles and Practice of Medicine" will find Dr. Tidy's Synopsis invaluable in preparation for examination trials. The pathology, symptomatology, and treatment of each disease are effectively presented. The use of different kinds of type makes for comfortable reading and quick reference. The work has been thoroughly revised and brought up-to-date. No less than forty-five pages are devoted to

¹ "A Synopsis of Medicine." By Henry Letheby Tidy, M.A., M.D., B.Ch., F.R.C.P., Assistant Physician to St. Thomas's Hospital, and Physician to the Great Northern Central Hospital. Second edition, revised. Pp. xv + 956. Bristol: John Wright and Sons, Ltd. 1922. Price 21s. net.

tuberculosis, and this section furnishes a remarkably complete and accurate condensation of present-day knowledge regarding the nature, manifestation, and management of the disease. We have no hesitation in according an enthusiastic welcome to this most serviceable and reliable synopsis of the essentials of medicine.

The 1921 meeting of the British Association for the Advancement of Science was held in Edinburgh,¹ and it was a happy and wise arrangement to provide a collection of statements regarding the rôle of Modern Athens in the development of science. The special volume composed by these communications from experts is a handsome one, and contains information expressed in a particularly attractive form. The volume will be of permanent interest and value to scientists and all who realize the importance of securing historical data relating to the development of theoretical and applied science. The following list of subjects and writers will indicate the comprehensive character of this notable volume: "Preface" and "Mathematics and Natural Philosophy," by Dr. Cargill G. Knott; "Astronomy," by Professor R. A. Sampson; "Actuarial Science," by Dr. A. E. Sprague; "Meteorology," by Andrew Watt, M.A.; "Pure Chemistry," by Dr. Leonard Dobbin; "Industrial Chemistry," by Dr. A. P. Laurie; "Shale Oil Industry," by D. R. Stuart, F.I.C.; "Geology," by E. B. Bailey, B.A., and D. Tait; "Engineering," by Professor T. Hudson Beare; "Zoology," by Dr. James Ritchie; "Oceanography," by Professor W. A. Herdman, C.B.E.; "Botany," by W. W. Smith, M.A.; "Forestry," by Sir John Maxwell Stirling-Maxwell, Bart.; "Agriculture," by J. A. S. Watson, B.Sc.; "Geography," by G. G. Chisholm, M.A.; "Anthropology," by J. H. Cunningham, F.S.A. (Scot.); "Physical Anthropology," by Professor Arthur Robinson; "Medicine, to 1870," by Dr. J. D. Comrie; "Surgery," by Alexander Miles, M.D.; "Medicine, from 1870," by Professor James Ritchie; "Dentistry," by William Guy, F.R.C.S.; "Economics," by Professor J. Shield Nicholson; "Psychology" and "Education," by James Drever, M.A.; and "Social Reform," by Nora Milnes, B.Sc.

The National Association for the Prevention of Tuberculosis has recently issued a new edition of the "Handbook of Tuberculosis Schemes."² It provides a valuable and up-to-date reference work regarding tuberculosis activities throughout the United Kingdom and Ireland. It is, indeed, a fairly complete directory of the different administrative areas, with data relating to the mortality from tuberculosis and the provision available for the cure and treatment of tuberculous cases. The first edition was issued in 1916, the second in 1919, and now the 1921 issue is based on figures for 1920, supplied by the Registrar-Generals for England and Wales and Scotland. The National Association must be congratulated on having accomplished a notable service by the compilation and issue of this excellent reference work. It will prove invaluable to all interested in the organization and administration of tuberculosis work throughout the country.

¹ "Edinburgh's Place in Scientific Progress." Prepared for the Edinburgh Meeting of the British Association by the Local Editorial Committee. Pp. xvi + 263, with portraits. Edinburgh and London: W. and R. Chambers, Ltd. 1921.

² National Association for the Prevention of Tuberculosis, 20, Hanover Square, London, W. 1. "Handbook of Tuberculosis Schemes for Great Britain and Ireland." Third Edition. Pp. x + 275. London: Adlard and Son and West Newman, Ltd., Bartholomew Close, E.C. 1. 1921. Price 10s.

"Notes on Tuberculosis Sanatorium Planning"¹ is an American Government official document, which deserves the study of all medical officers, architects, and others interested in the planning and construction of sanatoria on up-to-date lines. There is also a suggestive section on "Laboratories for Tuberculosis Sanatoria or Hospitals" by Dr. Edward R. Baldwin.

Colonel Sir Robert H. Firth, K.B.E., C.B., late Professor of Military Hygiene in the Royal Military College, has prepared a *multum in parvo* 14-page folder giving in clear, condensed, practical form information and guidance regarding the preservation of health and the prevention of disease.² Whatever views we may have on the relative importance of seed and soil in the development of tuberculosis, it is certain that such advice as appears in "Health in Few Words" will go far in assisting anti-tuberculosis endeavours. Tuberculosis officers will do well to secure copies for distribution to their patients.

The Disabled Society, which exists "to assist all who have lost limbs on Service," has issued a remarkable and most practical and serviceable handbook.³ It contains an immense amount of information which will be invaluable to those who have lost arm or leg in war or by other accident or disease. The work should be studied by surgeons and all others who have to advise in regard to tuberculous cripples. There is a splendid section on Sports for the Limbless. The handbook has a Foreword by Mr. John Galsworthy, and is issued under cost price.

Many arrested cases of tuberculosis have taken up poultry farming. It certainly provides an interesting form of out-of-doors work, and if conducted with practical wisdom and in a business-like way can be made a profitable investment. All intending to take up poultry work or already engaged in this occupation will be well advised to secure a copy of Mr. Edward Brown's "Poultry-Keeper's Vade Mecum."⁴ It is a pocket manual crammed full of serviceable information regarding breeds and breeding of poultry, control of the environment, feeding and general management. Such a guide will prove particularly helpful to those who are commencing to keep poultry; but even long-experienced experts will gather profitable tips from a perusal of these pages.

¹ "Notes on Tuberculosis Sanatorium Planning," being Reprint No. 677 from the Public Health Reports, June 17, 1921. Issued by the Treasury Department of the United States Public Health Service (Dr. Hugh S. Cumming, Surgeon-General) and printed by the Government Printing Office, Washington, U.S.A.

² "Health in Few Words." By R. H. Firth, D.P.H., F.R.C.S. A 14-page folder. London: John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, W. 1. 1921. Price 2d.

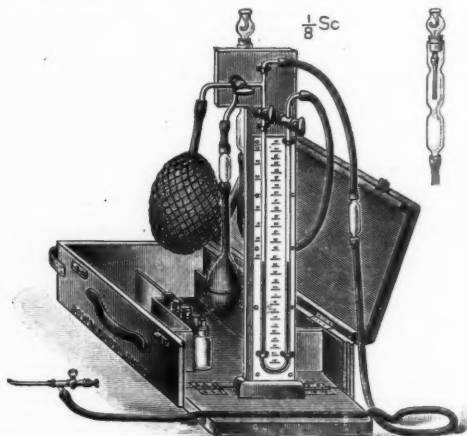
³ "Handbook for the Limbless." Edited by G. Howson, formerly Officer in Charge of Curative Workshops, Special Surgical Hospitals, Shepherd's Bush, W. 1. With a Foreword by John Galsworthy. Pp. 245, with illustrations. London: Published by the Disabled Society, 48, Grosvenor Square, W. 1. 1921. Price 1s. net. Post free 1s. 4½d.

⁴ "The Poultry-Keeper's Vade Mecum." By Edward Brown, F.L.S., President of the International Association of Poultry Instructors and Investigators. Pp. 157. London: Stanley Paul and Co., 31, Essex Street, Strand, W.C. 2. 1921. Price 2s. 6d. net.

PREPARATIONS AND APPLIANCES.

A NEW ARTIFICIAL PNEUMOTHORAX APPARATUS.

THOSE of our readers who have had experience of the difficulties incident to the transfer of APPARATUS FOR ARTIFICIAL PNEUMOTHORAX to a patient's house will welcome the advent of a really portable outfit by which the operation can be efficiently and expeditiously carried out. The apparatus, as indicated in the accompanying figure, is always in a condition for immediate use. The outfit is equipped with all requisites. The case is but little larger than the average attaché case. The



THE MARSHALL MODIFICATION OF THE MORELLI APPARATUS FOR THE PRODUCTION OF ARTIFICIAL PNEUMOTHORAX.

appliance, which has been designed by Mr. Geoffrey Marshall, is a modification of that designed by Professor Morelli, of Pavia.¹ It consists of a water manometer for registering intrapleural pressures. This is placed in connection with a collapsible indiarubber bag or reservoir of 400 c.c. capacity on the one hand, and with a flexible tube leading to a hollow needle on the other hand. The bag is filled with air, nitrogen, or other gas through the three-way tap shown in the figure on the left-

¹ The Marshall modification of the Morelli Apparatus for the Production of Artificial Pneumothorax is made by Messrs. Down Bros., Ltd., 21-23, St. Thomas's Street, S.E. 1. For further particulars regarding the apparatus, reference should be made to Sir J. Kingston Fowler's "Pulmonary Tuberculosis," London, Macmillan, 1921; and Mr. Marshall's article on "Artificial Pneumothorax Apparatus" in the *Lancet*, October 1, 1921.

hand side of the apparatus. To this tap is attached a bulb containing sterilized cotton-wool, which acts as a filter; a similar filter is connected with the flexible tube leading to the needle. Before use the flexible tube, filters, and needle are dry sterilized. There must be no moisture in the needle or delivery-tube if satisfactory readings are to be obtained on the manometer. The apparatus is reassembled, and the three-way tap is turned with the coloured spot to the left; gas is then run into the bag until the latter is almost full, but not distended. The three-way tap is then turned forty-five degrees, so that all its openings are sealed. The two manometer taps are then opened, and the needle is attached to the end of the flexible delivery-tube. The latter should be squeezed with the fingers to make sure that the manometer registers alterations of pressure in this tube. The site of operation having been selected—usually one of the intercostal spaces in the axilla—the skin is cleaned with ether and painted with iodine; skin and all tissues down to the pleura are then infiltrated with 1 per cent. novocaine. The pneumothorax needle is then slowly pushed through the infiltrated tissues until the manometer indicates that the pleural cavity has been reached. If a primary induction is being performed the pressures will be on the negative side, with oscillations from -3 to -7 cms. approximately. The three-way tap is turned so that the coloured bead is to the right. Gas will now be drawn into the pleural cavity from the bag. From time to time the three-way tap is closed in order to register the changes in the intrapleural pressure. As the intrapleural pressure rises gas will cease to be drawn into the chest, and the bag must be gently squeezed with the hand to continue the injection. When the requisite intrapleural pressure has been established the needle is withdrawn, and the puncture painted over with iodine and sealed with sterile wool soaked in collodion. In primary inductions it is usual to establish a mean intrapleural pressure of about $+2$ cm. water, in refills a mean pressure of about $+6$ cm. water. It is unwise to give more than 800 c.c. of gas in any one injection. The gas now generally used for all injections is filtered atmospheric air. When performing a primary induction, air or oxygen should be injected. A blunt-pointed needle, such as the Riviere, should be employed. The skin is incised with a small tenotomy knife, the needle is inserted with the sharp trocar in position until muscles are pierced, then the trocar is withdrawn, and the blunt cannula is pushed through the parietal pleura. For refills a smaller bore sharp-pointed needle fitted with a blunt stilette is supplied. No preliminary incision of the skin is necessary. The stilette is partially withdrawn, and the needle thrust through the skin into the muscles. The stilette is then pushed home so as to protect the sharp point of the needle. On further pressure the parietal pleura is penetrated with a palpable jerk. The stilette is now withdrawn until the tap at the base of the needle can be closed; the manometer will now register the intrapleural pressures, and gas is injected as described above. To simplify the apparatus required the refill needle and Riviere trocar are made to interchange on the same stopcock. The manometer should be filled with water to the line marked "O." It is usual to colour this water with a drop of red ink in order to render the movement more clearly visible, and to add a small quantity of antiseptic, such as carbolic acid, to keep the fluid sterile.

THE FUNDUS AURORASCOPE.

In a former number (July, 1921, vol. xv., No. 2, p. 90) we gave an illustrated notice of THE AURORASCOPE, or G.P. Pocket Throat and Ear Outfit, and indicated its value in school medical work, as well as for all classes of medical practitioners called to deal with cases requiring investigation of the nose, ear, and throat. A further development of this valuable novelty has been elaborated. This consists in the addition of an ophthalmoscope providing for the direct examination of the fundus oculi. The chief features of this valuable attachment are shown in the accompanying figures.¹



THE "AURORASCOPE"
OPHTHALMOSCOPIC
ATTACHMENT.

There are thirteen lenses, both + and -. This further development of an invaluable appliance will considerably increase its range of usefulness for the school medical officer and all general medical practitioners.

THE "MOSQUINETTE" PROTECTOR.

The conduct of the open-air life is not without its difficulties even in this country. In many parts of the world free exposure to fresh air is unavoidably associated with serious risks. Where malaria-bearing mosquitoes and disease-carrying flies are to be found some form of protecting appliances is essential. The "MosquINETTE" (sometimes known as the "Simpsonette") has found much favour in many parts of the world where the activities of mosquitoes and winged insects are not only a nuisance, but a serious source of dangerous infection. We direct attention in this journal to this ingenious and effective contrivance because it will undoubtedly prove of much service in



THE "MOSQUINETTE" PROTECTOR.

¹ An illustrated circular, giving full particulars regarding all forms of the Auroroscope, can be obtained on application to the Auroroscope Company, Fulwood House, Fulwood Place, Holborn, W.C. 1. The price of the ophthalmoscope complete with battery, etc., in case is £3 3s.; the attachment only, £2 2s. Registered post to all parts of the United Kingdom, 9d. extra.

facilitating the conduct of continuous open-air treatment in many districts. The accompanying illustrations make detailed description unnecessary. The "Mosquinette" is a protective headgear, which can be worn with a helmet or without a hat while walking, sitting, or lying down. A special non-inflammable form is provided for smokers. Even in this land the "Mosquinette" is likely to be appreciated by fishermen and other sportsmen, and also by artists and others who have to walk out of doors where irritating mosquitoes and midges abound. Many patients in sanatoria or undergoing heliotherapy will be thankful to possess a "Mosquinette."¹



THE "MOSQUINETTE" PROTECTOR.

Showing use at night or when resting.

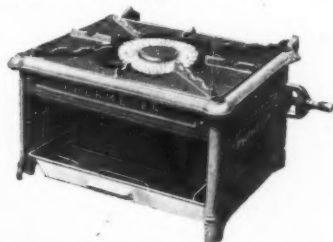
HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

In the hospital and sanatorium, as well as in the nursing home and private dwelling house, there is a desire for economic, reliable, and inexpensive appliances which shall save time, trouble, and money. Among new inventions, reference may here be made to several which are likely to be helpful to readers of this journal.

THE "THERMECON" GRILLER AND GAS-RING combined is a novelty which housewives and cooks will know how to appreciate.² It will



THE "THERMECON"
GRILLER.

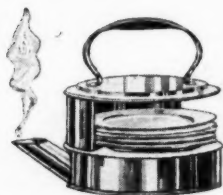


THE "THERMECON" GAS-RING
FOR BOILING.

certainly be of assistance to many tuberculous subjects and others who have to depend to a large extent on their own resources. The chief features of this excellent appliance are shown in the accompanying illustrations. For grilling, the disc-flame burner can be turned downwards, while for boiling the stage is set as in the second figure. All parts are made to standard pattern, and are interchangeable. The

¹ Particulars regarding the "Mosquinette" can be obtained from the Outfitting and Equipment Company, Ltd., 5-7, Southampton Street, Strand, W.C. 2. The price of the ordinary form is 21s. ; the non-inflammable form, with smoker, 25s.

² The "Thermeccon" Griller and Gas-Ring is made by J. Rowell and Sons, Byron Street Works, Newcastle-upon-Tyne. Price 15s. complete.

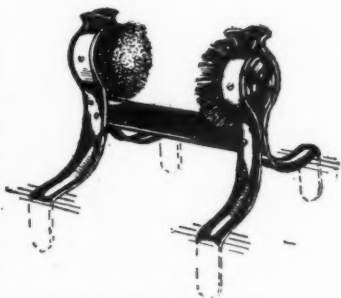


THE HOT-PLATE KETTLE.

manufacturers claim that it is "a gas and money saver."

Another sensible and serviceable contrivance is THE HOT-PLATE KETTLE.¹ This will be welcomed by many patients. The annexed figure indicates the characteristics of this ingenious domestic appliance. It provides a hot plate and warm chamber above the kettle cistern, which can be used for the heating of plates, foods, poultices, or even articles of clothing. This novel kettle should be very useful in the nursery and sick-room, as well as acceptable in the ordinary arrangements of the hospital or home. An extra elongated spout can also be obtained, thereby providing an admirable steam-kettle for special chest cases.

The firm of A. C. Harris and Co., of Leicester, have introduced a number of practical novelties specially suited to meet the needs of sanatoria and the requirements of those who live the open-air life. Attention may be directed to one of these—THE GRIP FOOT-SCRAPER.² It is just the sensible, helpful appliance which should be available at the entrance of every bungalow or shelter. Its general form is shown in the annexed figure. The appliance is made of steel, and is practically unbreakable. The width is 11 inches, and it is fitted with stiff brushes, which can be readily replaced.



THE GRIP FOOT-SCRAPER.

In every hospital, sanatorium, or dwelling where patients are



THE C-ESTA CHAIR.

¹ The Hot-Plate Kettle is supplied by the Hot Plate Hardware Company, Ltd., 70, High Holborn, W.C. 1. Price 12s. 6d.

² The Grip Foot-Scraper is made by A. C. Harris and Co., Clarendon Park, Leicester. Price 7s. 6d. complete; extra brushes, 2s. 6d. per pair.

undergoing open-air treatment there is a constant demand for comfortable, portable, strong folding-chairs. We have recently had an opportunity of testing THE C-ESTA HAMMOCK CHAIR,¹ an illustration of which is here shown. It is an attractive-looking chair for resting or reclining in any position, strongly built, adjustable, easily moved, and fitted with footpiece. The hammock material consists of rot-proof canvas, which can easily be cleaned. The chair is constructed on the cantilever principle, and will be appreciated by patients.

Under the designation of "LUXOL" two ingenious little lamps are now available, and will, we believe, be found useful by many of our readers.² The chief features are well indicated in the accompanying illustrations. The one is a "Safety Night Lamp" and the other is a



THE "LUXOL" SAFETY
LAMP.



THE "LUXOL" SAFETY
DARK-ROOM LAMP.

"Safety Dark-room Lamp." Both burn paraffin. There is no loose oil. The illuminant is taken up by a special absorbent, and there is an imperishable wick. For safety, convenience, and reliability, these lamps are to be strongly commended. They are excellent as travelling companions.

The Anglo-French Drug Company are introducing a number of excellent new preparations, which are likely to be of service to medical superintendents of sanatoria as well as to general medical practitioners.³ Among them is Valerianate "Gabail," a deodorized preparation of extract of valerian, valerianic acid, chloral hydrate, and ammonium carbonate. It is useful in neurasthenia, insomnia, and other nervous disorders. "Stannoxy" is an oxide of tin, and the metal is free from lead. It has been found of service in dealing with boils, carbuncles, acne, styes, pyorrhoea, and affections dependent on staphylococcal infection. "Pulver Soap" is a novelty. It is an antiseptic soap in powder, put up in pulverette form. These are supplied in tubes, each containing ten pulverettes, and so can be conveniently carried in the

¹ The C-Esta Chair is manufactured by Manuel Lloyd and Co., 262, Seven Sisters Road, Finsbury Park, N. 4. Price 25s.

² Particulars regarding the "Luxol" Lamps can be obtained from the "Luxol" Safety Light Company, Ltd., 118, Southwark Street, E.C. 1.

³ Particulars may be obtained on application to the Anglo-French Drug Company, Ltd., 238a, Gray's Inn Road, W.C. 1.

waistcoat pocket. Each pulverette contains corrosive sublimate in the proportion of 1 : 1,000. When it is necessary to cleanse the hands and instruments, a pulverette is pressed between the forefinger and thumb of one hand and the contents sprinkled into the palm of the other hand. The hand is then made wet and the palms rubbed together, when a creamy lather is produced.

The various Collosol preparations supplied from the Crookes' laboratories have found much favour in the treatment of a number of conditions in which such agents as antimony, arsenic, copper, iodine, iron, manganese, mercury, selenium, and sulphur seemed called for. And now a Collosol Calcium has been prepared, and promises to be helpful in the treatment of certain cases of tuberculosis.¹ A suggestive article on the subject has recently been published by Dr. E. E. Prest.² Medical superintendents of sanatoria would be well advised to give this new collosol of calcium a thorough testing.

DIMOL is a new benzene derivative—dimethylomethoxyphenol—in combination with tri- and tetra-methylophenols, recently introduced by Dr. Ainslie Walker. It has been proved to be a serviceable non-toxic intestinal disinfectant. Many morbid states occurring in tuberculous subjects and patients suffering from other infectious and toxæmic diseases are known to be due to, or are associated with, intestinal putrefaction or fermentation or consequent auto-intoxication, and in the control of these Dimol would seem to be of considerable service. In some cases of pulmonary tuberculosis improvement has followed the administration of Dimol. Dimol has also been used with benefit as an inhalant when administered as a fine vapour. The results so far obtained certainly indicate that this new drug should be thoroughly tested.³

The well-known series of Tuberculins prepared by the well-known firm of Meister Lucius and Brüning can now be obtained in this country.⁴

MARMITE, in view of our present knowledge regarding the value of accessory food factors or vitamins, is a preparation which should be found of service in dealing with various morbid conditions met with in tuberculous subjects.⁵ Marmite is a particularly palatable form of yeast extract rich in B vitamin, and has been found to promote leucocytosis in cases troubled with boils and carbuncles, and in other chronic septic conditions.

¹ Particulars regarding Collosol Calcium can be obtained on application to the Crookes' Laboratories, 22, Chenies Street, Tottenham Court Road, W.C. 1.

² "The Treatment of Tuberculosis with Colloid of Calcium," *British Medical Journal*, January 14, 1922.

³ For particulars regarding Dimol application should be made to the Anglo-French Drug Company, Ltd., 238a, Gray's Inn Road.

⁴ See "Tuberculin: Guide to the Diagnosis and Therapy of Human Tuberculosis by Means of Tubercle Bacilli Preparations." This brochure and particulars regarding the available series of Tuberculins, prepared by the Farbwerke vorm. Meister Lucius and Brüning, Hoechst-am-Main, can be obtained on application to A. C. Henry, 19, St. Dunstan's Hill, London, E.C. 3. We have recently received a series of these tuberculins suitable for diagnostic and therapeutic purposes.

⁵ A free sample jar of Marmite will be sent to any medical reader of this journal on application to the Marmite Food Extract Company, Ltd., Mincing Lane House, 59, Eastcheap, E.C. 3.

THE OUTLOOK.

THE TREATMENT OF TUBERCULOSIS.

EARLY in the present year the Ministry of Health issued a somewhat remarkable official publication (Circular 280) dealing with the "Treatment of Tuberculosis." It urges the importance of securing "the most economical utilization of residential institutions" and "the carrying out of the present scheme at the lowest cost consistent with efficiency." It is suggested that "it will be convenient, in considering the question of the duration of treatment in residential institutions, to group cases of adults suffering from pulmonary tuberculosis as follows: (1) Those in whom there is a reasonable prospect of securing complete arrest of the disease as the result of residential treatment; (2) those with extensive or rapidly progressing disease, in whom no material improvement of the condition can be expected, and who, for the remainder of their lives, are likely to need medical supervision and such nursing and palliative treatment as are afforded in a residential institution; (3) the large intermediate group of cases which do not fall within either of the first two groups." The Circular goes on to state that "patients in the first group usually require prolonged periods of treatment in a residential institution to secure ultimate arrest of the disease, and the treatment of these patients should be continued so long as may be necessary on medical grounds. Great care should be exercised in selecting patients for such prolonged treatment, and in particular to ensure that patients in whose sputum tubercle bacilli have not been found are not recommended for prolonged treatment in a residential institution unless and until there is adequate evidence to indicate that the patient is tuberculous, and unless the tuberculosis officer is satisfied that treatment in a residential institution is essential to secure arrest of the disease. Wherever practicable it should be the rule to give a preliminary period of observation and treatment for a few weeks before it is decided to recommend a patient for prolonged treatment. The tuberculosis officer should review all cases receiving prolonged residential treatment at intervals of three months, and patients should be discharged as soon as it is clear that they have received all the benefit they are likely to obtain from treatment in a sanatorium, and can return to ordinary conditions of life without undue risk of relapse. As regards the second group, preference in admission should be given to highly infective cases and to patients living in homes where there are children. Most of the patients in this class need to be retained in tuberculosis hospitals or in suitable wards of other residential institutions for the remainder of their lives, but some may recover to an unexpected extent and may become fit to be discharged. It is therefore important that the tuberculosis officer should review all the cases in this group at intervals. The third group includes patients with diverse clinical conditions, all of whom are distinguished from those in the first group by the fact that there seems to be no prospect of securing complete arrest of the disease. The duration of treatment of these cases should, there-

fore, in present circumstances, be strictly limited to that necessary to restore general health and working capacity as fully as circumstances permit, to educate the patients in the mode of life they should endeavour to follow at home, and to teach them how to avoid spreading the disease to others. The duration of treatment will vary with the clinical needs of the patients. In some cases educational treatment for a period of (say) four weeks in a residential institution will meet the needs, but in other cases a somewhat longer period may be required. In some instances it may be found that the response to treatment has been much more favourable than could have been reasonably anticipated, and this may occasionally justify the transfer of the patient to the first group. The essentially intermittent character of the disease makes it certain that many patients in the third group will relapse from time to time. Such patients may need to be re-admitted repeatedly for short periods of treatment. All cases in this group which are receiving treatment in residential institutions should be reviewed by the tuberculosis officer once a month in order to ensure that the beds are being used to the best possible advantage, and he should take care to recommend extensions of treatment only in cases where the patients are likely to derive appreciable benefit." It is stated that a separate Circular is to be issued in which special reference will be made to the question of the length of stay in residential institutions of tuberculous ex-service men falling under the provisions of Memo. 30/T. "Subject to the observations contained in that Circular, it will be for the Authority, within the limits of the general principles set out above, to decide, on the advice of the tuberculosis officer, for what periods the patients for whose treatment the Authority are paying shall remain in residential institutions. It will be realized that the tuberculosis officer is in the best position to ensure that the beds available to the Authority are used most effectively and with due regard to the relative needs of the tuberculous persons in the area of the Authority. It will be impossible for the tuberculosis officer to discharge his responsibility with effect unless he acts in close collaboration with the Medical Superintendents of the institutions to which patients are sent, and the Authority should arrange for him to have the advantage of personal consultation with them at the institutions." The following appears regarding the cost of residential treatment: "Final claims in respect of 1920-21 expenditure have not yet, in many cases, been received, but a comparison of the costs of the various items per patient per week has been made in those cases which are available, and the Minister is struck by the wide variations between the costs in different institutions. He finds, for example, that the cost of salaries per patient per week varies from less than 9s. to over £1, that the cost of provisions ranges from less than 21s. to over 35s., and that the expenditure on drugs is in some cases less than 1s. and in other cases as much as 3s. 6d. It is, of course, obvious that varying local conditions must largely affect expenditure. The geographical position and structural character of the sanatorium, the length of the staff working day, their scale of bonus, local prices, and other factors over which the administrative staff have no control, must, to a considerable extent, determine maintenance costs, but it is evident that there remains a wide field in which the rate of expenditure depends on administration. From recent investigations by his officers into this aspect of institutional treatment,

the Minister is satisfied that substantial economies can be effected in the existing service. It is essential both to economy and efficiency that each residential institution should be under the control of one officer, normally the Medical Superintendent, who should be made responsible for its administration and for securing due economy in every direction. He should exercise careful and detailed supervision over all departments of administration and should give separate consideration to each head of expenditure—*e.g.*, number and cost of indoor staff in relation to number of patients; number of outdoor staff; cost of drugs; cost of laundry arrangements (which can sometimes be reduced by combining this work for two or more institutions); heating and lighting arrangements. "Special attention should be paid to the feeding of patients, which is the most costly individual item in the maintenance of a residential institution." A footnote here appears in the Circular as follows: "Adult patients taking an ordinary mixed diet should not as a rule require milk to any great extent. In most institutions chilled meat is used; this is more economical than home-killed meat in most areas, and gives equally satisfactory results. Except in special cases, a butter ration is not essential, if the necessary fats are provided in the form of margarine and dripping and an adequate supply of green vegetables is provided." "All waste must be eliminated. Except in the application of the general rationing scheme during the war, no dietary scales have been prescribed by this Department in regard to tuberculosis institutions, but the Minister is advised that the dietary scales set out in the circular letter issued by the Local Government Board on October 17, 1918, proved satisfactory in actual practice, and that any substantial excess over these scales is unnecessary in the interests of the patients, although it is reasonable to supplement them in certain minor respects. By a systematic and regular comparison of costs the Medical Superintendent should ascertain to what extent his efforts are reflected in the rate of expenditure, and it is important that the collaboration of the Accounting Officer of the Authority should be obtained in this work. It need hardly be stated that the greatest value is obtained from a residential institution when the beds are kept fully occupied and the overhead charges are distributed over the greatest number of patient days. With this object in view, the Authority should obtain a monthly return showing the extent to which the beds available in their institutions have been occupied. If the returns show that the beds have not been filled and if the Authority also send cases to institutions not belonging to them, they should consider whether it is not practicable to treat these cases in their own institutions. If they are still unable to keep the beds filled, they should, as suggested in Circular 257, consider, in conjunction with other Local Authorities, whether one or more of the residential institutions of these Authorities should not be closed and the patients concentrated in the remaining institutions. It has been suggested to the Minister that it would assist materially in the desired direction if a reasonably uniform and simple method of assessment and tabulation of costs could be adopted for all Local Authorities' Institutions devoted wholly or partially to the treatment of tuberculosis, and if tables were published by the Ministry annually showing the results. He is having a model form drawn up for consideration, and is inviting representatives of the County Councils Association, the Association of

Municipal Corporations, the Society of Superintendents of Tuberculosis Institutions, the County Accountants Society, and the Institute of Municipal Treasurers and Accountants, to discuss the question with his officers." This circular is addressed to County and County Borough Councils and Tuberculosis Joint Committees in England, and bears the signature of Sir W. A. Robinson.

NOTES AND RECORDS.

Sir James Kingston Fowler in his recently issued work on "Pulmonary Tuberculosis" includes the following in his delightful collection of *obiter dicta*: "A diploma in tuberculosis for those who are to deal with tuberculosis is just as necessary as a diploma in tropical medicine for those who are to treat tropical disease." Tuberculosis officers and other medical advisers specializing in the diagnosis and treatment of tuberculosis must be essentially clinicians. We have repeatedly urged in this journal the necessity for providing adequate training for those who are taking up the responsible duties of caring for the tuberculous.¹ We are therefore glad to be able to announce that a Diploma in Tuberculous Diseases (T.D.D.) has been established by the University of Wales.²

Dr. Rollier's summer and winter Courses of Post-Graduate Instruction in Heliotherapy have been attended by medical men and women from all parts of the world. A further course of lectures and clinical demonstrations in heliotherapy and with special reference to surgical tuberculosis will be given at Leysin, Switzerland, this coming summer from August 15 to 19. The course will be conducted by Dr. Rollier and his assistants. Lectures will be delivered in French, but arrangements for interpretation into English will be made. Full particulars will be sent on application to the "Secrétariat Médical du Dr. Rollier, Les Frênes, Leysin-Village." The number of subscriptions is limited, and applications should be sent as early as possible.

At the forthcoming Plymouth Congress of the Royal Institute of Public Health, May 31 to June 5, there will be an important discussion on the Prevention of Tuberculosis from Human and Bovine Sources. Tuberculosis officers and others interested in the prevention and arrest of tuberculosis should make a point of being present.³

¹ See articles by Sir Henry Gauvain, the late Professor Sir G. S. Woodhead, K.B.E., Dr. D. Barty King, and Professor S. Lyle Cummins, C.B., in the issues of this journal for January, April, and July, 1921.

² Particulars regarding the regulations for the Tuberculous Diseases Diploma of the University of Wales (T.D.D. Wales) will be found in the *Lancet* and *British Medical Journal* for February 25, 1922.

³ A programme and full particulars of the Plymouth Congress of the Royal Institute of Public Health may be obtained on application to the offices of the R.I.P.H., 37, Russell Square, W.C. 1.

PUBLISHERS' NOTICE.

The Publishers of the "British Journal of Tuberculosis" are desirous of purchasing a limited quantity of back numbers. For particulars as to dates, etc., see page x.